UltimusPlus Series Dispensers

Operating Manual

Models Included:

- UltimusPlus I
- UltimusPlus II

Nordson

EFD

Contents

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Contents (continued)

Contents (continued)

Introduction

This manual provides specifications, operating features, installation, setup, operation, troubleshooting, and parts information for UltimusPlus Series pneumatic benchtop fluid dispensers. The UltimusPlus dispenser is designed to provide precise dispensing control for advanced applications of glue, oil, grease, epoxy, silicone, sealants, cyanoacrylates, solder paste, and other assembly fluids dispensed with syringe barrels.

UltimusPlus Dispenser Models

- UltimusPlus I dispensers feature 0.7–7.0 bar (10–100 psi) constant-bleed air pressure regulation and provide greater control when dispensing any type of fluid.

- UltimusPlus II dispensers feature 0.02–1.0 bar (0.3–15 psi) constant-bleed air pressure regulation and provide greater control when dispensing low-viscosity or thin fluids.

- All UltimusPlus dispensers include the NX protocol (network connectivity) for direct communication with a programmable logic controller (PLC), or other manufacturing plant controllers, via Ethernet. This technology enhancement allows operators to control all dispensing parameters directly from a PLC or computer, providing complete remote control of the UltimusPlus dispenser. For complete information about the NX protocol, refer to "Appendix B, Remote Communication" on page 60.

Overview of Features

- Intuitive, easy-to-use touchscreen interface that provides simultaneous readout of dispense time, pressure, vacuum, and deposit count

- Storage of 16 dispensing programs in a Program Library

- USB connectivity for exporting or importing dispense programs and for exporting log data

- Ability to remotely switch between programs or trigger a dispense using basic protocol

- Ability to use a PLC or PC for remote monitoring and control of the dispenser using NX protocol

- Ability to use a PC and / or tablet for remote monitoring and control of the dispenser using HTTP

- Ability to export the Dispense Log via an FTP client application

- Time increment adjustments as small as 0.0001 seconds

- MultiShot™ capability, allowing the operator to dispense multiple deposits with only one cycle initiate (such as one press of the foot pedal)

- Dispense log data collection, including the collection of dispensing parameter data (dispense time, pressure, vacuum) and the date, day, and hour / time of each dispense cycle

- Full operator lockout of time, pressure, and vacuum settings

- Optional barcode scanner accessory available for quick program recognition and change

- Easy integration into an automated dispensing system via a single plug-and-play cable

- Input / output connectivity for initiating a dispense cycle (via voltage initiate or contact closure), program selection, emergency stop, clearing alarms, an alarm out signal, and end-of-cycle feedback.

- On UltimusPlus I dispensers, sleep mode for reduced power and air consumption during downtimes

Nordson EFD Product Safety Statement

⚠ WARNING

The safety message that follows has a WARNING level hazard.
Failure to comply could result in death or serious injury.

ELECTRIC SHOCK

Risk of electric shock. Disconnect power before removing covers and / or disconnect, lock out, and tag switches before servicing electrical equipment. If you receive even a slight electrical shock, shut down all equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

⚠ CAUTION

The safety messages that follow have a CAUTION level hazard.
Failure to comply may result in minor or moderate injury.

READ MANUAL

Read manual for proper use of this equipment. Follow all safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate. Make sure these instructions and all other equipment documents are accessible to persons operating or servicing equipment.

MAXIMUM AIR PRESSURE

Unless otherwise noted in the product manual, the maximum air input pressure is 7.0 bar (100 psi). Excessive air input pressure may damage the equipment. Air input pressure is intended to be applied through an external air pressure regulator rated for 0 to 7.0 bar (0 to 100 psi).

RELEASE PRESSURE

Release hydraulic and pneumatic pressure before opening, adjusting, or servicing pressurized systems or components.

BURNS

Hot surfaces! Avoid contact with the hot metal surfaces of heated components. If contact can not be avoided, wear heat-protective gloves and clothing when working around heated equipment. Failure to avoid contact with hot metal surfaces can result in personal injury.

Nordson EFD Product Safety Statement (continued)

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements.

Element	Symbol	Prefix
Fluorine	F	"Fluoro-"
Chlorine	Cl	"Chloro-"
Bromine	Br	"Bromo-"
Iodine	I	"Iodo-"

Check the Safety Data Sheet (SDS) or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your EFD representative for compatible EFD components.

High Pressure Fluids

High pressure fluids, unless they are safely contained, are extremely hazardous. Always release fluid pressure before adjusting or servicing high pressure equipment. A jet of high pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

⚠ WARNING

Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show the doctor the following note.
- Tell the doctor what kind of material you were dispensing.

Medical Alert — Airless Spray Wounds: Note to Physician

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Qualified Personnel

Equipment owners are responsible for making sure that EFD equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Nordson EFD Product Safety Statement (continued)

Intended Use

Use of EFD equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property. Some examples of unintended use of equipment include:

- Using incompatible materials.
- Making unauthorized modifications.
- Removing or bypassing safety guards or interlocks.
- Using incompatible or damaged parts.
- Using unapproved auxiliary equipment.
- Operating equipment in excess of maximum ratings.
- Operating equipment in an explosive atmosphere.

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson EFD equipment will be voided if instructions for installation, operation, and service are not followed. If the equipment is used in a manner not specified by Nordson EFD, the protection provided by the equipment may be impaired.

Personal Safety

To prevent injury, follow these instructions:

- Do not operate or service equipment unless you are qualified.

- Do not operate equipment unless safety guards, doors, and covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.

- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.

- Make sure spray areas and other work areas are adequately ventilated.

- When using a syringe barrel, always keep the dispensing end of the tip pointing towards the work and away from the body or face. Store syringe barrels with the tip pointing down when they are not in use.

- Obtain and read the Safety Data Sheet (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials and use recommended personal protection devices.

- Be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located.

- Wear hearing protection to protect against hearing loss that can be caused by exposure to vacuum exhaust port noise over long periods of time.

Nordson EFD Product Safety Statement (continued)

Fire Safety

To prevent a fire or explosion, follow these instructions:

- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or the SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located.

Preventive Maintenance

As part of maintaining continuous trouble-free use of this product, Nordson EFD recommends the following simple preventive maintenance checks:

- Periodically inspect tube-to-fitting connections for proper fit. Secure as necessary.
- Check tubing for cracks and contamination. Replace tubing as necessary.
- Check all wiring connections for looseness. Tighten as necessary.
- Clean: If a front panel requires cleaning, use a clean, soft, damp rag with a mild detergent cleaner. DO NOT USE strong solvents (MEK, acetone, THF, etc.) as they will damage the front panel material.
- Maintain: Use only a clean, dry air supply to the unit. The equipment does not require any other regular maintenance.
- Test: Verify the operation of features and the performance of equipment using the appropriate sections of this manual. Return faulty or defective units to Nordson EFD for replacement.
- Use only replacement parts that are designed for use with the original equipment. Contact your Nordson EFD representative for information and advice.

Nordson EFD Product Safety Statement (continued)

Important Disposable Component Safety Information

All Nordson EFD disposable components, including syringe barrels, cartridges, pistons, tip caps, end caps, and dispense tips, are precision engineered for one-time use. Attempting to clean and re-use components will compromise dispensing accuracy and may increase the risk of personal injury.

Always wear appropriate protective equipment and clothing suitable for your dispensing application and adhere to the following guidelines:

- Do not heat syringe barrels or cartridges to a temperature greater than 38° C (100° F).
- Dispose of components according to local regulations after one-time use.
- Do not clean components with strong solvents (MEK, acetone, THF, etc.).
- Clean cartridge retainer systems and barrel loaders with mild detergents only.
- To prevent fluid waste, use Nordson EFD SmoothFlow™ pistons.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

1. Disconnect and lock out system electrical power. If using hydraulic and pneumatic shutoff valves, close and relieve pressure.

2. For Nordson EFD air-powered dispensers, remove the syringe barrel from the adapter assembly. For Nordson EFD electro-mechanical dispensers, slowly unscrew the barrel retainer and remove the barrel from the actuator.

3. Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Specifications

NOTE: Specifications and technical details are subject to change without prior notification.

Item	Specification
Cabinet size	21.2W x 10.8H x 19.2D cm (8.33W x 4.27H x 7.55D")
Weight	1.8 kg (4.0 lb)
Power adapter	AC input: 100–240 VAC (+/-10%), ~50/60 Hz, 0.6 Amp DC Output: 24 VDC @ 3.75 Amp
Internal voltage	24 VDC
Cycle rate	Exceeds 600 cycles per minute
Time range	0.0001–9999 s Accuracy: Within ±0.05% of the selected time setting Repeatability: Less than 16 µs at any time setting
Foot pedal	Voltage: 24 VDC Current: 20 mA
End-of-cycle feedback circuits	24 VDC, 100 mA maximum
Cycle initiate	Foot pedal, finger switch, 24 VDC signal, or mechanical contact closure
Input air pressure	UltimusPlus I: 5.5–7.0 bar (80–100 psi) UltimusPlus II: 1.7–2.4 bar (25–35 psi)
Air output	UltimusPlus I: 0.7–7.0 bar (10–100 psi) UltimusPlus II: 0.02–1.0 bar (0.3–15 psi)
Pressure readout accuracy	UltimusPlus I: ±0.14 bar (2.0 psi) UltimusPlus II: ±0.02 bar (0.3 psi)
Vacuum	0–1.3 inHG (0–18 inH$_2$O)
Vacuum readout accuracy	±0.15 inHG (±2.0 inH$_2$O) **NOTE:** The dispenser vacuum readout accuracy is calibrated from 0–0.44 inHG (0–6 inH$_2$O).
Ambient operating conditions	Temperature: 5–45° C (41–113° F) Relative humidity (RH): 85% at 30° C (86° F), non-condensing Height above sea level: 2,000 m maximum (6,562 ft)
Approvals	CE, UKCA, TUV, RoHS, WEEE, China RoHS

Specifications (continued)
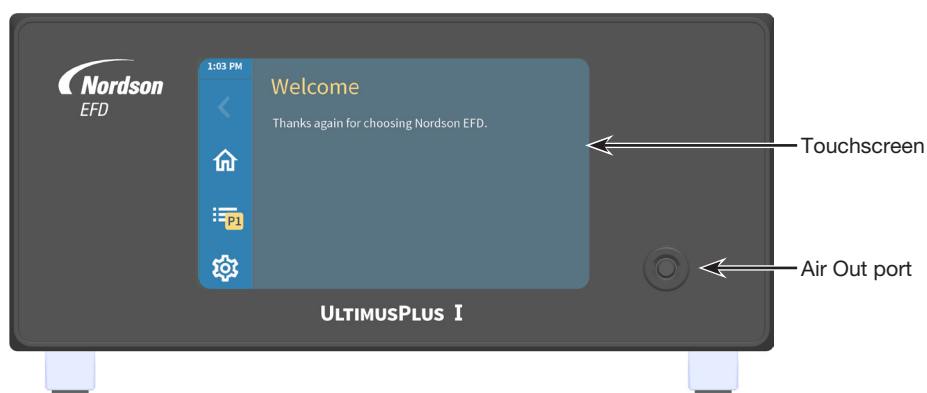
RoHS标准相关声明 (China RoHS Hazardous Material Declaration)

产品名称 Part Name	有害物质及元素 Toxic or Hazardous Substances and Elements					
	铅 Lead (Pb)	汞 mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr6)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴联苯醚 Polybrominated Diphenyl Ethers (PBDE)
外部接口 External Electrical Connectors	**X**	**0**	**0**	**0**	**0**	**0**
0: 表示该产品所含有的危险成分或有害物质含量依照EIP-A，EIP-B，EIP-C 的标准低于SJ/T11363-2006 限定要求。 Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is below the limit requirement in SJ/T11363-2006. **X:** 表示该产品所含有的危险成分或有害物质含量依照EIP-A，EIP-B，EIP-C 的标准高于SJ/T11363-2006 限定要求． Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is above the limit requirement in SJ/T11363-2006.						

WEEE Directive

This equipment is regulated by the European Union under WEEE Directive (2012/19/EU). Refer to www.nordsonefd.com/WEEE for information about how to properly dispose of this equipment.

Operating Features

Item	Description
Touchscreen	User interface for the UltimusPlus dispenser. Refer to "Overview of the UltimusPlus User Interface" on page 14 for details. **NOTE:** No protective screen is available for the touchscreen. To prevent operators from using the touchscreen with dirty hands or gloves, a mouse can connected to the USB port on the back panel.
Air Out port	Air output tubing connection to provide regulated air pressure to the syringe barrel (an additional Air Out port is provided on the back of the dispenser) **NOTE:** Air does not flow through the port until tubing is connected.

Operating Features (continued)
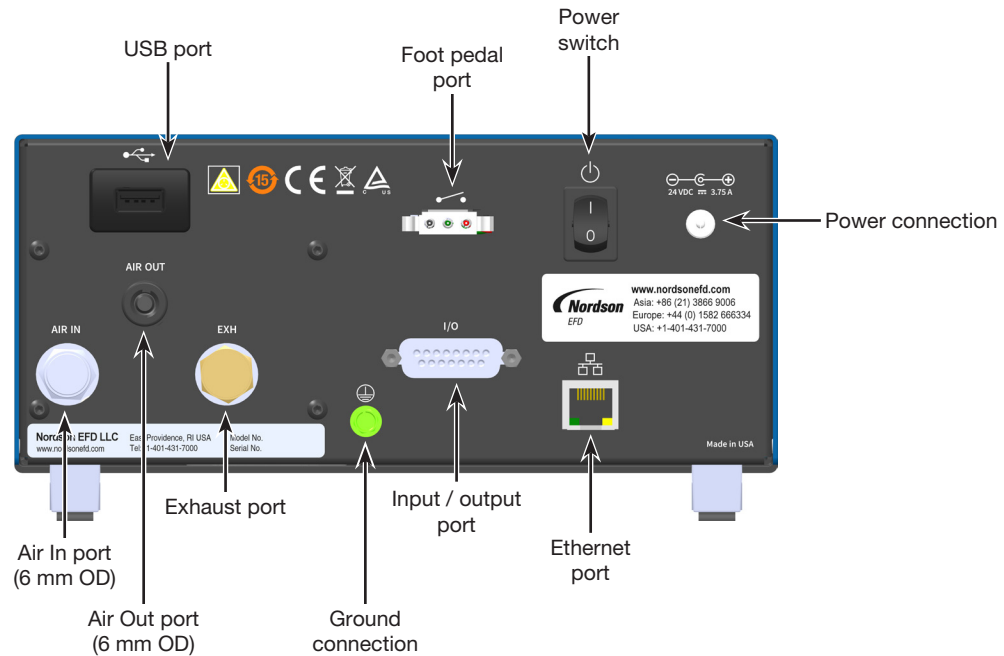
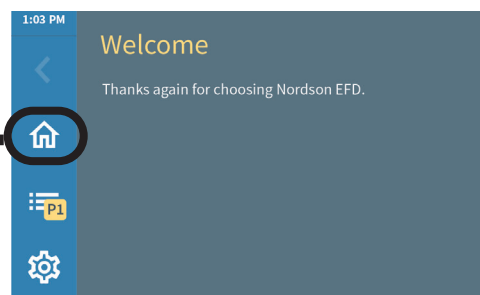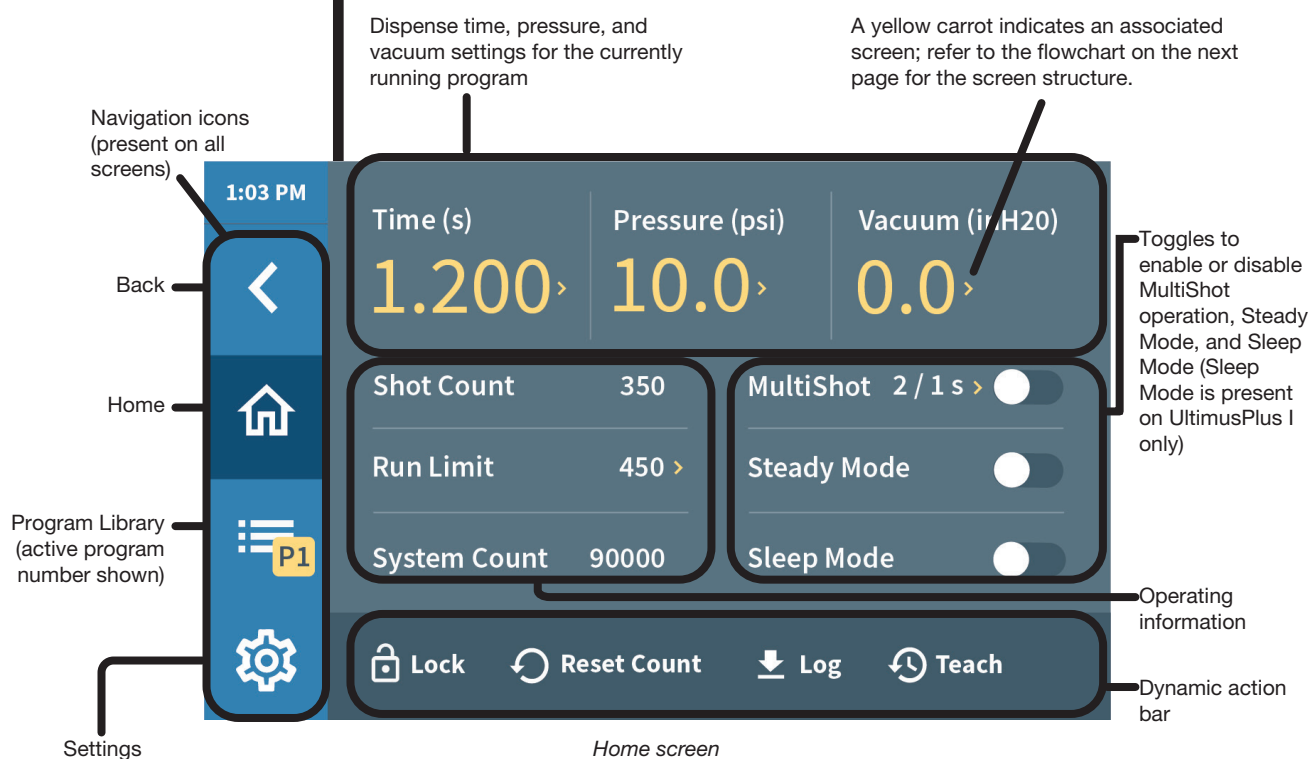| Item	Description
USB port	USB port for (1) exporting or importing programs or (2) for exporting the dispense log. You can also connect a mouse to this USB port to provide an alternative method for interacting with the touchscreen.
Foot pedal port	Connection for a foot pedal or optional finger switch to initiate the dispense cycle
Power switch	Main power switch for the dispenser
Power input port	24 VDC power supply cord input connection. The UltimusPlus power pack automatically adjusts for 100–240 VAC. Use only the supplied universal power pack. The unit is shipped with four power plugs (one USA and three international plugs) and a 1.8 m (5.9 ft) power cord.
Air In port	6 mm OD air input tubing connection from the factory air supply. Clean, dry, filtered factory air is required to meet warranty. If your air supply is not filtered, order the 5-micron filter regulator (P/N 7002002).
Air Out port	6 mm OD air output tubing connection to provide regulated air pressure to the syringe barrel (an additional Air Out port is provided on the front of the dispenser) **NOTE:** Air does not flow through the port until tubing is connected.
Exhaust (EXH) port	Pneumatic port for an optional exhaust connection. If needed, you can connect a cleanroom filter muffler (P/N 7017049) to filter the output air to meet Fed 209-B (0.5 micron particulates).
Ground	Ground wire connection
I/O port	Input / output port to allow the dispenser to interface with external control circuits. Refer to "Input / Output Connections" on page 54 for details.
Ethernet port	Ethernet port for a standard Ethernet cable. You can use an Ethernet cable to integrate the dispenser into an automated dispensing system. Refer to "Connecting an Ethernet Cable for Factory Integration" on page 39 for details.

Overview of the UltimusPlus User Interface

When the dispenser is powered on, the Welcome screen appears after about 45 seconds. Select the Home button to go to the Home screen.

From the Home screen, you can access all dispenser functions. Refer to "Operation" on page 29 for programming and dispensing procedures.

Navigation

Dispense time, pressure, and vacuum settings for the currently running program

A yellow carrot indicates an associated screen; refer to the flowchart on the next page for the screen structure.

Navigation icons (present on all screens)

Back

Home

Program Library (active program number shown)

Settings

Toggles to enable or disable MultiShot operation, Steady Mode, and Sleep Mode (Sleep Mode is present on UltimusPlus I only)

Operating information

Dynamic action bar

Home screen

Back	Export	Program Library	Settings	Unlocked
Backspace	Home	Reset Count	Teach	
Error	Locked	Saved	Test	

Icons

Overview of the UltimusPlus User Interface (continued)

Flowchart of Dispenser Screens

Time	Pressure	Vacuum

Home

	Time	Vacuum
Back	Shot Count	MultiShot On / Off
Home	Run Limit	Steady Mode On / Off
Programs	System Count	Sleep Mode On / Off
Settings	Lock Reset Count	Log Teach

MultiShot
Pause Time
Count

Run Limit

Teach
Teach
Test Teach Time

Dispense Log
Export and Delete Log
Export and Keep Log

Locked / Unlocked
Enter Password

Settings

Company Info	Software Update
Sleep Mode	Ethernet
Language	System Clock
Units of Measure	Password

Company Info

Software Update

Sleep Mode
(UltimusPlus I only)
5   10   60

Ethernet

Language
English German French
Spanish Chinese
Japanese Korean

System Clock

Units of Measure
psi   bar   kPa
inH$_2$O   inHG   kPa

Password
Enter Current
Password

Password
Enter New Password

Password
Re-Enter New
Password

Program Library
Import / Export Library

Program Edit
Time Pressure Vacuum
Barcode   Run Limit
MultiShot   Steady Mode

Import / Export Library
Export Library
Import Library

Time	Pressure	Vacuum	Run Limit

Barcode
Assign Barcode
Delete Barcode

MultiShot
Pause Time
Count

Overview of the UltimusPlus User Interface (continued)

About Programs

The dispenser includes 16 preprogrammed dispense programs in the Program Library. On all screens, the active program number (P1 to P16) is displayed in a yellow box.

You can change the currently active program by pressing the program number in the Program Library or by pressing the dark gray (inactive) program box on any screen.

You can adjust any program by editing its settings, accomplished by pressing the name of the program in the Program Library. The dispenser automatically renames an edited program based on the new settings, as shown under "How the System Names Programs" below.

- For details on how to activate (or switch) programs, refer to "Activating a Program" on page 30.
- For details on how to edit a program, refer to "Editing a Program" on page 31.

Currently active program number on all screens

Currently active program number and program name on the Program Details screen when the currently active program is being edited or viewed
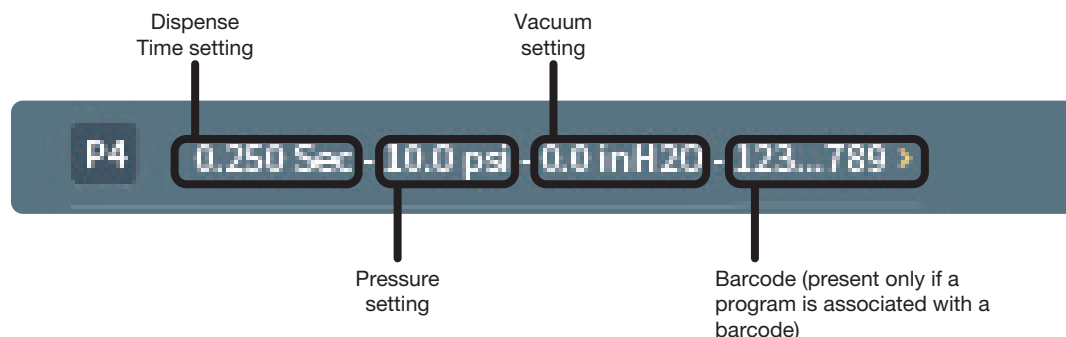
Program number and program name on the Program Details screen when the program being edited is different from the currently active program (press the gray P3 box to make P3 the active program)

Home screen
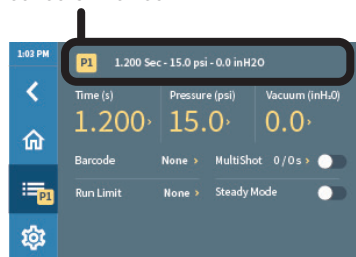
Program Details screen (currently active program being edited)

Program Details screen (program being edited different from currently active program)

How the System Names Programs

Dispense Time setting

Vacuum setting

Pressure setting

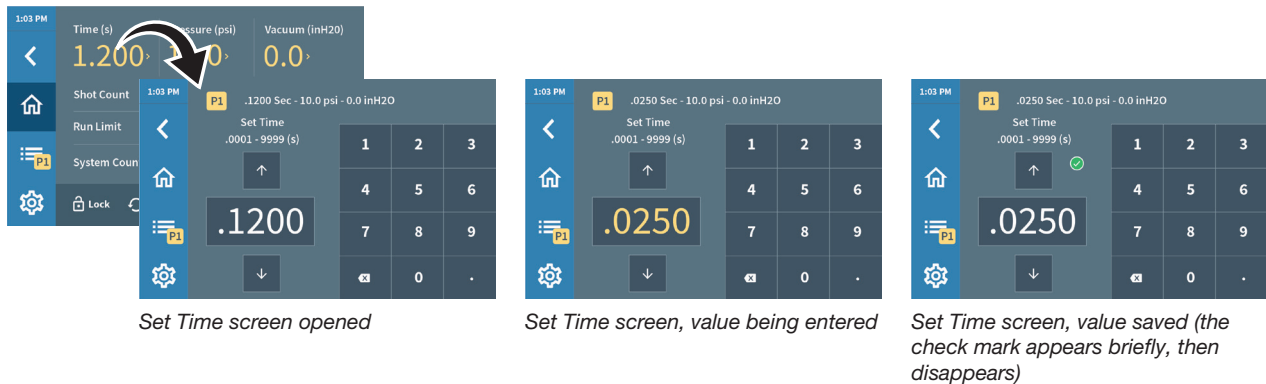Barcode (present only if a program is associated with a barcode)

Overview of the UltimusPlus User Interface (continued)

Entering Values

For editable settings, the touchscreen functions as follows:

• If applicable, a numeric entry keypad opens.

• As you enter a value, the value-entry field turns yellow.

• If a value is outside of the acceptable range, a red box appears to identify the error.

• After a few seconds of no interaction, the entered value turns white and a check mark appears briefly, indicating that the value is saved.

Set Time screen opened　　　　*Set Time screen, value being entered*　　　　*Set Time screen, value saved (the check mark appears briefly, then disappears)*

Dispense Modes

When powered on, the UltimusPlus dispenser opens to the last used program and dispense mode.

Dispense Mode	Typical Application	Description or Comment
Steady	When you want to dispense different volume amounts for each deposit	In STEADY mode, the system dispenses for as long as the dispense cycle is initiated (either by foot pedal, finger switch, voltage initiate, or contact closure). You can place the system in Steady mode on the Home screen. Refer to "Setting Up the Dispenser for Steady Mode Operation" on page 25 for details.
Timed	When you want to dispense a set amount of time for each deposit	In TIMED mode, the system dispenses a single deposit for each dispense cycle initiate (either by foot pedal, finger switch, voltage initiate, or contact closure). Deposit size is based on the dispense time, pressure, and vacuum settings shown on the touchscreen. Refer to "Setting Up the Dispenser for Timed Mode Operation" on page 25 for details.
Teach	When you want to teach the system the desired deposit size	In TEACH mode, you can "teach" the system the desired deposit size to determine the correct amount of time needed to achieve the deposit size. Refer to "Using the Teach Mode to Set Up the Dispenser for Timed Operation" on page 26 for details.

Overview of the UltimusPlus User Interface (continued)

Ranges for All Editable Settings

For your reference, the following table lists all user-editable settings and their corresponding range of values.

| Variable	Range of Values	Description or Comment
Time	0.0001–9999 (s)	Sets the open time of the dispense cycle in seconds
Pressure	UltimusPlus I: 0.7–7.0 bar (10–100 psi) UltimusPlus II: 0.02–1.0 bar (0.3–15 psi)	Sets the air pressure to the syringe barrel in psi or bar
Vacuum	0.0–18.0 inH$_2$O	Sets the vacuum pressure in inches of water or inches of mercury
MultiShot	Pause Time: 0.0001–999.9 (s) Count: 0–9999	For each cycle initiate (for example, one press of the foot pedal), sets how many deposits (Count) the system dispenses and how many seconds elapse between deposits (Pause Time).
Run Limit	None (0)–9999	Sets the maximum number of shots (cycle initiates) for a program; when the Run Limit is reached, the system stops responding to a cycle initiate. Use Reset Count to reset the Shot Count for a program to 0. **NOTE:** In the MultiShot mode, each dispense cycle is counted in the Run Limit.
Sleep Mode	Enabled or disabled (toggle) Time: 5, 10, 60 (min)	If Sleep Mode is enabled, sets the Time (in minutes) to elapse after the last dispense before the system enters the Sleep Mode
Language	English, Chinese, French, German, Japanese, Korean, Spanish	Sets the language
Pressure Units	psi, bar, kPa	Sets how the system displays pressure units
Vacuum Units	inH$_2$O, inHG, kPa	Sets how the system displays vacuum units
System Clock	12 hour, 24 hour	Sets how the system displays time
Password	4 digit password	Changes the password that locks and unlocks the system

Installation

1 Unpack the Unit

Unpack the contents of the package and lay them out on a clean work bench:

a. Dispenser

b. Syringe barrel stand

c. 2.4 m (8 ft) of 6 mm air supply tubing and 1/4 NPT fitting

d. Foot pedal assembly

e. Power supply and power cord (ordered separately)

(Not shown)

• Dot standards sheet
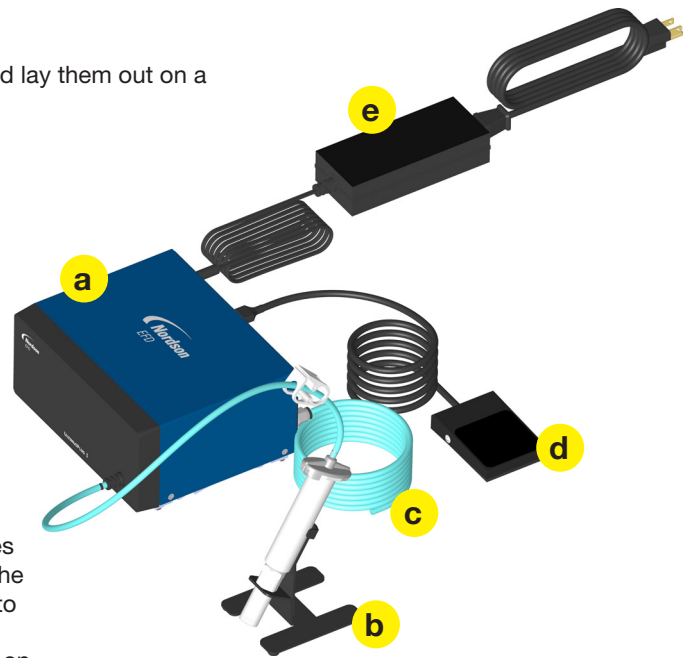
NOTE: This manual provides procedures for using the touchscreen interface on the dispenser. For details on using TCP/IP to remotely control the dispenser, refer to "Appendix B, Remote Communication" on page 60.

2 Connect Power

a. Connect the power plug to the power pack. The unit is shipped with a USA-compatible plug and three international plugs. Attach the correct plug to match local power outlets.

b. Connect the power cord to the back of the UltimusPlus.

c. Connect the power cord to your local power source.

d. Connect a suitable ground wire to the ground connection.
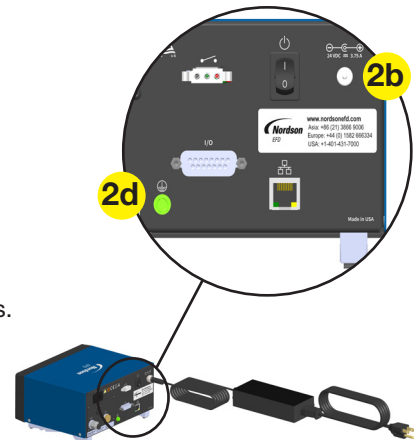
3 Connect the Foot Pedal

• Plug the foot pedal into the back of the UltimusPlus.

NOTE: The UltimusPlus is normally operated using the supplied foot pedal. You can also operate the UltimusPlus with an optional finger switch, or, you can initiate dispense cycles through the initiate terminals available on the I/O port. Refer to the following to connect dispense cycle initiate signals as an alternative to a foot pedal or finger switch:

- "Voltage Initiate Circuit" on page 54

- "Contact Closure Circuit" on page 57

• (Optional) Connect other inputs / outputs as applicable for your operation. Refer to "Input / Output Connections" on page 54 for details and wiring diagrams.
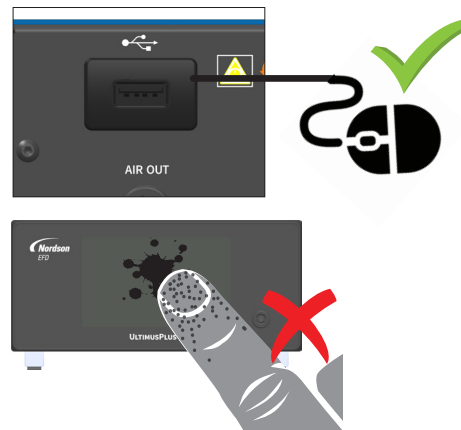
Installation (continued)

4 (Optional) Connect a Mouse

> ### ⚠ CAUTION
>
> Risk of equipment damage. Do not use the touchscreen with dirty hands or gloves.

If there is a risk of screen contamination, connect a mouse to the USB port. The touchscreen can be operated with the mouse.

5 Connect the Air Input

a. Install a pressure regulator that is capable of providing the air supply recommended for the dispenser.

    NOTE: Clean, dry filtered factory air is required to meet warranty. If your air supply is not filtered, order the 5-micron filter / regulator (P/N 7002002).

6 mm

> ### ⚠ WARNING
>
> Bottled nitrogen can be used. If high pressure bottled air or nitrogen is used, a high pressure regulator must be installed on the bottle and set at 7 bar (100 psi) maximum. In this instance, the 5-micron filter regulator is not required.

b. Push one end of the 6 mm air input hose into the AIR IN port on the back of the UltimusPlus.

c. Connect the other end of the hose to the factory air supply.

d. Set the factory air supply as follows:
    - UltimusPlus I: 5.5–7.0 bar (80–100 psi)
    - UltimusPlus II: 1.7–2.4 bar (25–35 psi)
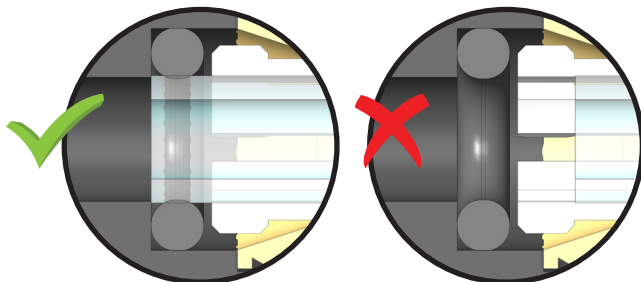
Installation (continued)

6 Connect the Air Output

Connect the tubing from the supplied adapter assembly to either AIR OUT port.

NOTES:

- The dispenser has two Air Out ports: one of the front panel and one on the back panel. You can use either one.

- An 0.25 NPT thread exhaust output is available on the back panel. If needed, connect a cleanroom filter muffler (P/N 7017049) to filter the output air to meet Fed 209-B (0.5 micron particulates).

7 Connect the Syringe Barrel / Dispense Tip

Refer to "Syringe Barrel Filling" on page 44 for detailed information on the filling and use of syringe barrels.

NOTE: If you are dispensing a watery fluid, refer to "Top Filling of Pourable Materials" on page 45.

a. Attach an EFD syringe barrel filled with your fluid to the adapter assembly.

b. Snap the safety clip on the adapter hose closed to prevent dripping. Remember to unsnap the clip when ready to dispense.

c. Replace the tip cap with an EFD precision dispense tip.

d. Place the syringe barrel in the barrel holder.
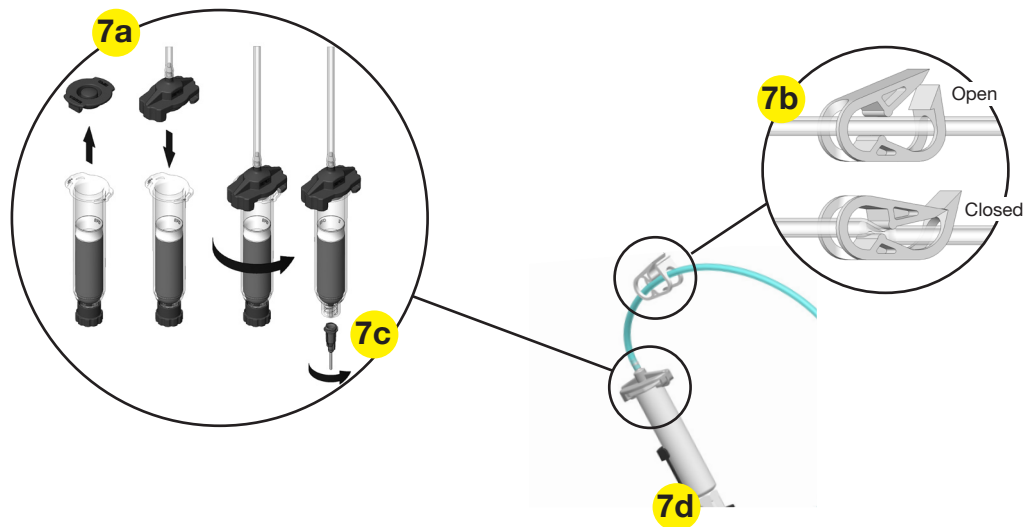
Installation (continued)

8 Switch the Power On

a. Place the power switch on the back of the dispenser in the ON position.

   After about 45 seconds, the Welcome screen appears.

b. Press Home ⌂ to open the Home screen.

   NOTE: The UltimusPlus is shipped with default settings for the display of language (English), air pressure (psi), and vacuum (inH$_2$O). If these settings are acceptable, skip to step #9. Otherwise, go to "System Settings" on page 40 to make the desired changes, return here.

then
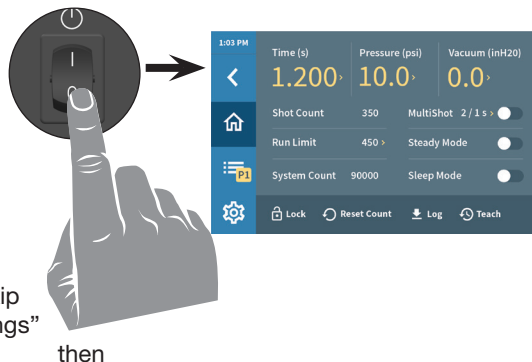
9 Set the Dispense Time

a. Press Time.

b. Enter a starting dispense time setting.

   NOTE: You can use either the up / down buttons or the keypad to adjust settings.

c. Press Home ⌂ to return to the Home screen.

10 Set the Air Pressure

a. Press Pressure.

b. For initial startup and testing, set the air pressure as follows:

   • UltimusPlus I: 1.0 bar (15 psi)
   • UltimusPlus II: 0.3 bar (5 psi)

c. Press Home ⌂ to return to the Home screen.

Installation (continued)

11 Set the Vacuum

a. Press Vacuum.

b. Set the vacuum at 0.0 for initial startup and testing.

c. Press Home 🏠 to return to the Home screen.
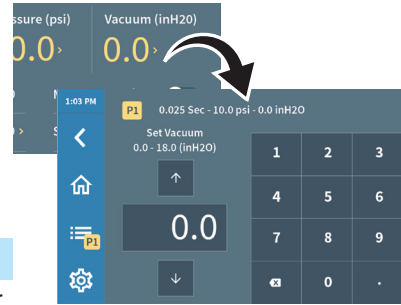
⚠ CAUTION

Use EFD filter / muffler P/N 7017049 or wear adequate ear protection when operating the vacuum in close proximity for a prolonged period of time.

12 Purge the Tip

a. Enable the Steady mode by moving the toggle to the ON position.

b. Press the foot pedal and allow material to flow from the tip until it is free of air, then release the foot pedal.
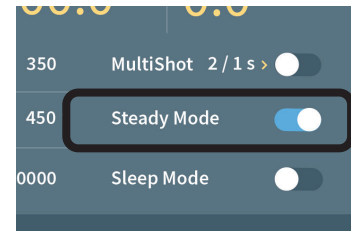
13 Connect to Ancillary Components

Install or connect to other system components as applicable. Refer to the quick start guide and / or operating manual provided with those components for installation and setup instructions.

Installation is now complete. Continue to "Initial Startup and Testing" on page 24 to set up dispensing for your application.

NOTES:

- UltimusPlus dispensers can be integrated into an automated dispensing system for remote switching of dispense programs and / or dispense cycle initiation. Refer to "Connecting an Ethernet Cable for Factory Integration" on page 39.

- UltimusPlus dispensers include the NX protocol for remote monitoring and control of the dispenser. Refer to "Appendix B, Remote Communication" on page 60 for all information pertaining to the NX capability.

Initial Startup and Testing

Deposit size is controlled by dispense time, pressure, and tip size.

Use the procedures in this section, along with the supplied Dot Standards test sheet, to set up and test the system using the operational mode best suited for your application:

- For applications in which the deposit amount, or volume, will vary, refer to "Setting Up the Dispenser for Steady Mode Operation" on page 25.

- For applications in which the deposit size must be the same for each dispense cycle, refer to "Setting Up the Dispenser for Timed Mode Operation" on page 25.

NOTES:

- Refer to the decision tree below for a visual aid.

- More tips and helpful suggestions for setup are provided under "Helpful Hints" on page 28. Refer to this information as needed during initial startup and testing.
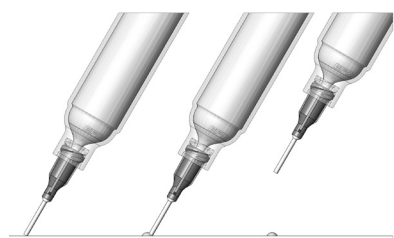
Remember — always bring the tip in contact with the work surface at the illustrated angle. After the tip is in position, press the foot pedal. Release the pedal and remove the tip by lifting straight up.
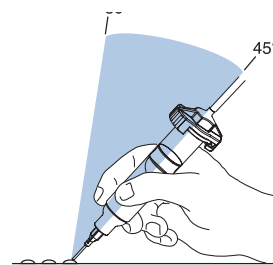
Correct angle for consistent deposits.

Decision Tree for Setting Up Dispenser Operation
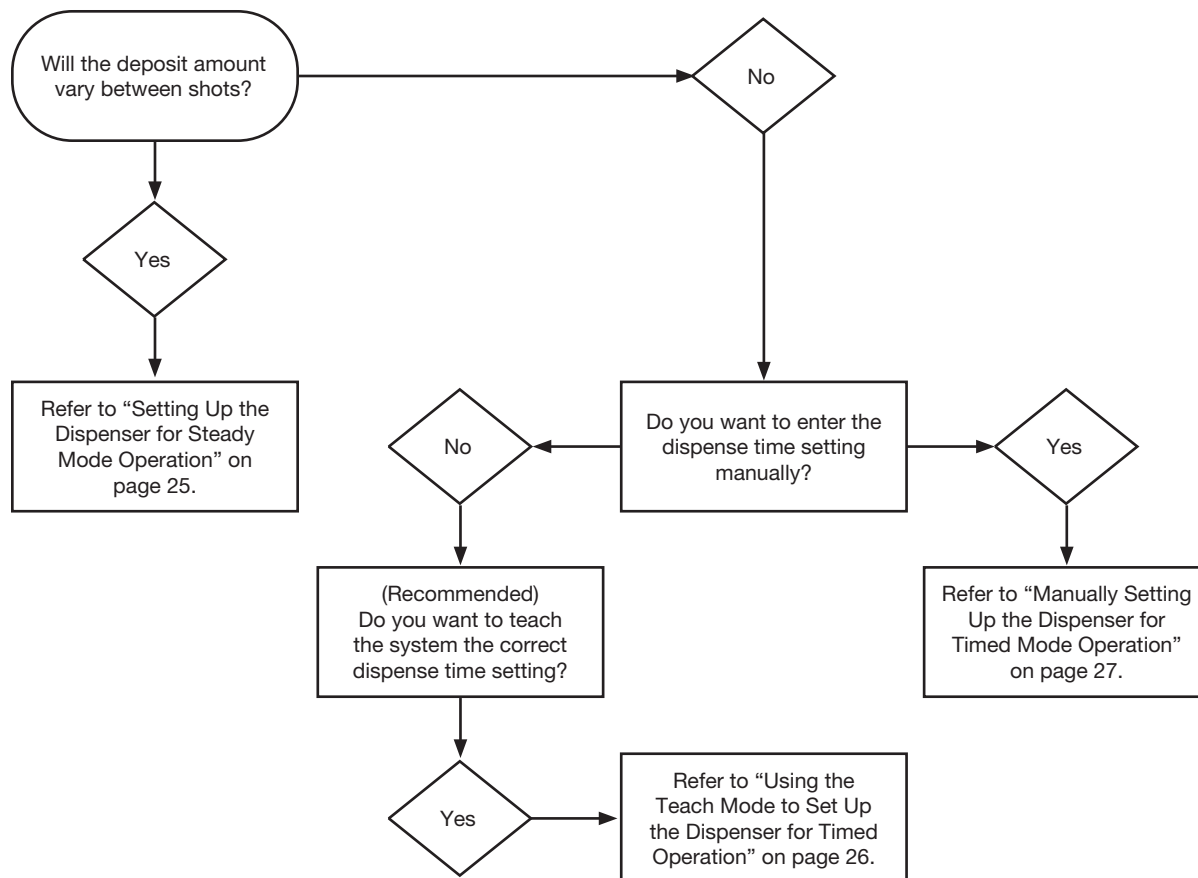
Initial Startup and Testing (continued)

Setting Up the Dispenser for Steady Mode Operation

1. If you have not already done so, purge the tip. Refer to "Purge the Tip" on page 23 as needed.

2. Enable the Steady mode.

3. Set Pressure and Vacuum to the following recommended starting values:

Dispenser	Recommended Pressure	Recommended Vacuum
UltimusPlus I	1.0 bar (15 psi)	0 inH$_2$O (0 inHG)
UltimusPlus II	0.3 bar (5 psi)	0 inH$_2$O (0 inHG)

4. Press and hold the foot pedal (or finger switch) to start the dispense cycle.

5. Press Pressure to open the pressure screen. Slowly increase the pressure until material begins to dispense in a controlled flow (not too fast, not too slow).
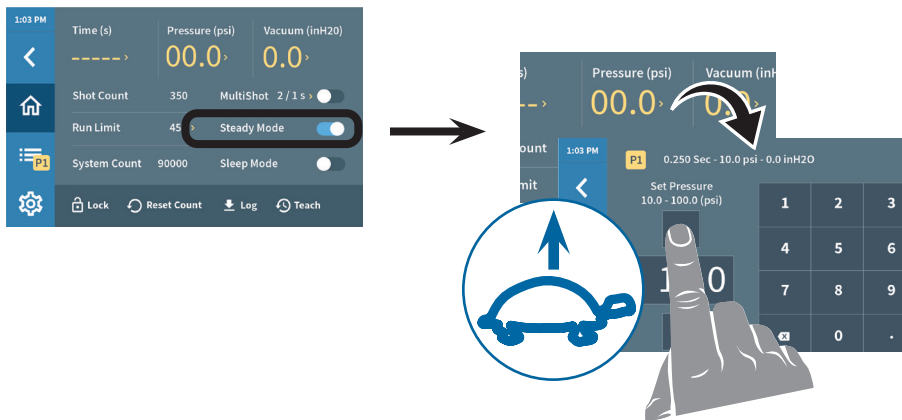
6. When the desired dispense flow is reached, release the foot pedal.

7. Press Home ⌂ to use the current settings.

Setting Up the Dispenser for Timed Mode Operation

You can set up the dispenser for timed operation either manually or by using the Teach mode. Nordson EFD recommends using the Teach mode, which allows you to "teach" the system the correct dispense time setting based on deposit size. Refer to the following section as applicable:

- **(Recommended)** Refer to "Using the Teach Mode to Set Up the Dispenser for Timed Operation" on page 26 to use the Teach mode to teach the dispenser the dispense time setting.

- Refer to "Manually Setting Up the Dispenser for Timed Mode Operation" on page 27 to manually enter the dispense time setting.

NOTE: Refer to "Decision Tree for Setting Up Dispenser Operation" on page 24 for a decision flowchart on choosing Timed vs. Teach mode.

Initial Startup and Testing (continued)

Using the Teach Mode to Set Up the Dispenser for Timed Operation

1. If you have not already done so, purge the tip. Refer to "Purge the Tip" on page 23 as needed.

2. Ensure that the Steady mode is disabled.

3. On the Home screen, press Teach ⏱. The Teach screen opens.
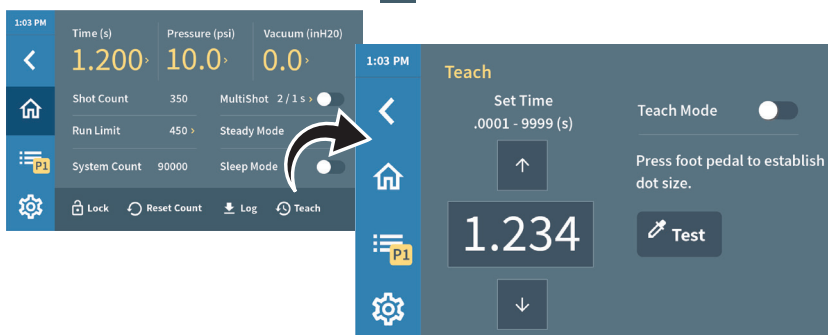
4. Rest the dispense tip on the Dot Standards sheet.

5. Press and then release the foot pedal to establish your dot size.

   NOTES:

   - Depressing the foot pedal repeatedly has a cumulative effect on the dot size and dispense time.
   - Press Test to repeat the dot at the dispense time setting displayed on the screen.
   - To fine-tune the dispense time, press the up and down arrows to adjust the time. Press Test to see the resulting deposit size.

6. When the desired dispense volume is reached, press Home ⌂ to use the displayed time setting.

Initial Startup and Testing (continued)

Manually Setting Up the Dispenser for Timed Mode Operation

1. If you have not already done so, purge the tip. Refer to "Purge the Tip" on page 23 as needed.

2. Ensure that the Steady mode is disabled.

3. Press Programs ⊟ to open to the Program Library screen.

4. Press a program name to open the Program Details screen.

5. Press Time. The Set Time screen opens.

6. Set the Time to 0.025 seconds.
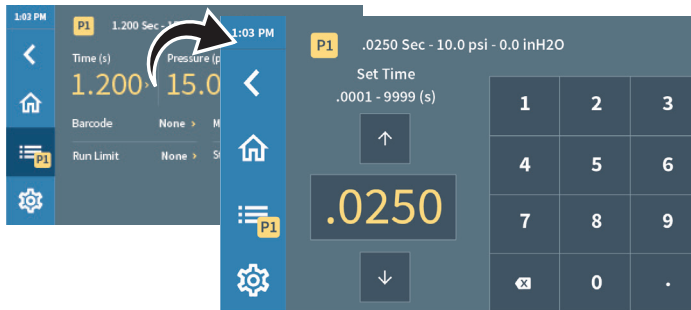
7. Rest the dispense tip on the Dot Standards sheet.

8. Press the foot pedal (or finger switch) to start the dispense cycle.

    NOTE: The pedal only needs to be pressed for a moment. The complete time will run once you activate the dispense cycle.

9. **Changing the time changes the deposit size.** If your dot is too small, increase the dispense time to increase the deposit size. If your dot is too large, decrease the dispense time to decrease the deposit size.

10. When the desired dispense volume is reached, press Home ⌂ to use the current setting.

Initial Startup and Testing (continued)

Helpful Hints

- There are three core variables for setting up the UltimusPlus high precision fluid dispenser: dispense time, pressure, and vacuum. Adjust just one of these at a time, in small increments, to achieve the correct deposit.

- Another important variable is tip size. Choose the right tip for the deposit type. Remember, smaller tips require more pressure and more time. Try different tips without changing the time or pressure settings and observe the results.

- Tapered tips reduce the amount of air pressure needed to dispense thick materials. They also help prevent drooling at the end of a dispense cycle.

- To ensure smooth fluid flow and to make consistent deposits, keep the dispense tip at a 45° angle to the work surface.

- Use EFD SmoothFlow pistons to make barrel loading, dispensing, and fluid handling cleaner, safer, and more accurate.

⚠ CAUTION

If you dispense watery fluids and choose not to use EFD pistons, do not increase vacuum pressure rapidly and do not tip the barrel. Vacuum may pull fluid into the adapter hose, or, if the syringe barrel is tipped, fluid may flow back into the dispenser.

- Always use new EFD syringe barrels and tips. Carefully dispose of after use. This procedure ensures maximum cleanliness, prevents contamination, and provides proper safety.

- Do not completely fill the syringe barrel. For most fluids, optimum fill is a maximum 2/3 of the barrel capacity. For cyanoacrylates or watery fluids, optimum fill is 1/2 of the barrel capacity.

Suggestions on Settings

- Avoid high pressure settings with very short time settings (example: 5.5 bar / 80 psi at less than 0.010 seconds). The ideal setup matches air pressure and tip size to produce a "workable" flow rate — no splashing, but not too slow either — with a time setting that is not extremely low.

- With any fluid, always give the air pressure time to do its job. Moderate time and pressure provides the best results since dispensing pressure remains at its peak for a longer period of time.

- Longer dispense time settings generally provide the highest accuracy. However, in the interest of cost-effective production, do not use excessively long dispense time settings. Experiment to find what works best for your application.

- If an Error message indicates that the system did not reach the desired pressure before a dispense cycle was initiated, decrease the Pressure or increase the Time. This ensures that the dispenser operates to its fullest potential with the highest accuracy.

Operation

Once installation and initial startup and testing are complete, the system is ready for routine operation. This section includes general, task-oriented procedures for your quick reference as needed.

Routine Startup

NOTE: This manual provides procedures for using the touchscreen interface on the dispenser. For details on using the NX protocol to remotely control the dispenser, refer to "Appendix B, Remote Communication" on page 60.

1. Place the power switch on the back of the dispenser in the ON position. After about 45 seconds, the Welcome screen appears.

2. Press Home 🏠 to open the Home screen. The screen displays the program that was active before shutdown.

    NOTE: The currently active program number appears next to the Program icon.

3. Ensure that there is an air supply to the dispenser.

4. Start your process.

Setting the Dispense Time, Pressure, or Vacuum

1. Press Home 🏠 to open to the Home screen.

2. Press Time, Pressure, or Vacuum, then enter the desired setting.

    Saved settings are indicated by a check mark ✓, which appears briefly.

    NOTES:

    • Changes are saved automatically as you enter them. Refer to "Entering Values" on page 17 for details.

    • Refer to "Ranges for All Editable Settings" on page 18 for details on all editable settings.

3. Press Home 🏠 to return to the Home screen.

Set Time screen

Operation (continued)

Activating a Program

The dispenser includes 16 typical dispense programs in the Program Library. You can make any of these programs the active program.

There are two ways to activate a program:

- By pressing the program number box in the Program Library
- By pressing a dark gray program number box present on any screen other than the Program Library screen

NOTE: You can also edit any of these programs to create a new program. Refer to "Editing a Program" on page 31 for details.
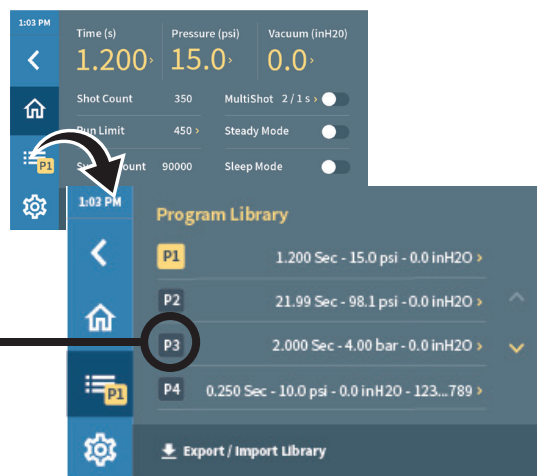
To Activate a Program through the Program Library

1. Press Programs ⊞. The Program Library screen opens.

2. Press the **program number** (not the program name) to activate the program.

3. Press Home ⌂ to return to the Home screen.

    The currently active program number appears next to the Programs icon, and the Time, Pressure, Vacuum, Run Limit, MultiShot, and Steady Mode values update to show the program settings.

Location of the program number on the Home screen

To Activate a Program by Pressing the Program Number Box

Press any dark gray program number box to activate that program.

Example of a dark gray program number box (Program Details screen shown)

Operation (continued)

Editing a Program

The dispenser includes 16 typical dispense programs in the Program Library. You can edit the settings of any program.

There are two ways to edit a program:

- By making changes to the currently active program from the Home screen
- By opening a program in the Program Library

NOTES:

- There are always 16 programs in the program library; you can edit any of these programs at any time with your desired settings.
- Changes are saved automatically as you enter them. Refer to "Entering Values" on page 17 for details.
- Programs are named by the dispenser. Refer to "How the System Names Programs" on page 16 for details.
- Refer to "Ranges for All Editable Settings" on page 18 for details on all editable settings.

To Edit the Currently Active Program on the Home Screen

1. Go to the Home 🏠 screen.

2. From the Home screen, you can make changes to the following editable settings:

    - Time, Pressure, and Vacuum (refer to "Setting the Dispense Time, Pressure, or Vacuum" on page 29)
    - Run Limit (refer to "Setting a Run Limit, Viewing the Shot Count or System Count, and Resetting the Shot Count" on page 42)
    - MultiShot (refer to "Using the MultiShot Feature" on page 36)
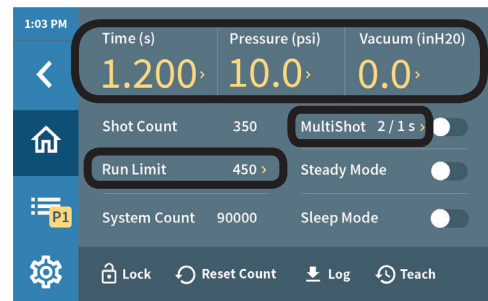
Editable settings on the Home screen: Time, Pressure, Vacuum, Run Limit, and MultiShot

To Edit a Program from the Program Library

1. Press Programs ☰. The Program Library screen opens.

2. Press the **name of a program** (not the program number) to open the Program Details screen for that program.

3. On the Program Details screen, make the desired changes. Press Back ‹ to return to the currently open Program Details screen between changes.

4. To make the program you are editing the currently active program, press the **program number** of the edited program.

    The selected program number appears next to the Program icon.

Editing Program 3 (P3) on the Program Details screen while Program 1 (P1) is still the active program

Operation (continued)

Locking or Unlocking the System

NOTE: The default password is 1111. Refer to "Changing the System Password" on page 41 to change the password.

To Lock the System

1. On the Home screen, press Lock 🔒.

    The Lockout screen opens.

2. Enter the password to lock the system.

    The system automatically returns to the Home screen, which is grayed out. A closed lock 🔒 on the Unlock button also indicates the locked status.

To Unlock the System

1. Press the Unlock button 🔒.

2. On the Lockout screen, enter the 4-digit password.

    The system returns automatically returns to the Home screen and normal operation is restored.

Operation (continued)

Exporting Programs to a USB Drive

You can use the USB port on the dispenser to export all programs in the Program Library to a USB drive. Once exported, the programs can then be imported to a different dispenser.

1. Insert a USB drive into the USB port.

2. Press Programs ▤ > Export / Import Library ⬇.

   The Export / Import Library screen opens.

   NOTE: This screen differs slightly for an UltimusPlus dispenser being operated via the NX web interface.

3. Press Export Library to export all programs to the USB drive.

   If the export is successful, the system indicates the following: "Export successful." If the export fails, refer to "Dispenser Warnings" on page 50 to troubleshoot the problem.

   NOTE: Exported dispenser programs are formatted as an *.ult file.

4. Press Home ⌂ to return to the Home screen.
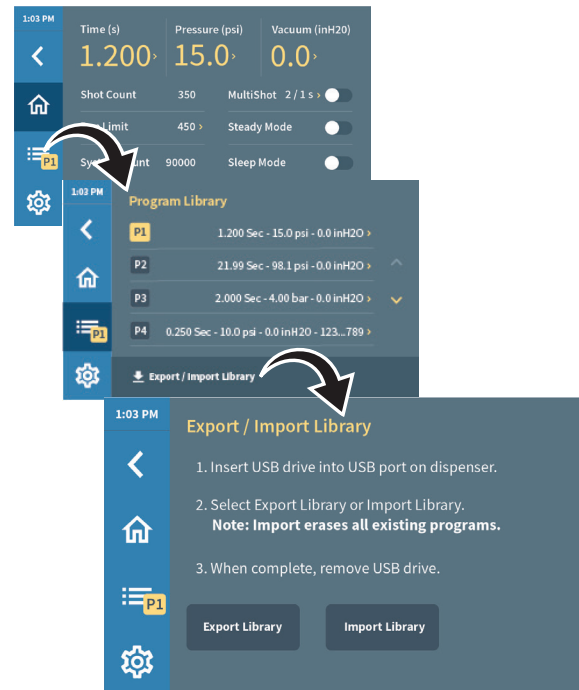
Importing Programs from a USB Drive to a Dispenser

1. Insert a USB drive into the USB port.

2. Press Programs ▤ > Export / Import Library ⬇.

3. Press Import Library to import all programs on the USB drive to the Program Library.

   If the import is successful, the system indicates the following: "Import successful." If the import fails, refer to "Dispenser Warnings" on page 50 to troubleshoot the problem.

   NOTE: All the programs on the USB drive are imported to the dispenser, replacing existing programs.

4. Press Home ⌂ to return to the Home screen.

Operation (continued)

Using the Barcode Scanner

You can use a barcode scanner to change the active dispense program. Use of the barcode scanning function requires the following:

- The optional barcode scanner must be connected to the USB port on the dispenser. Refer to "Accessories" on page 49 for the scanner part number.
- The barcode for the workpiece must be assigned to a dispense program.

NOTE: A barcode can be assigned to only one dispense program. If the same (previously assigned) barcode is assigned to a different program, then the barcode will be reassigned from the original program to the later program.

Barcode Types

The barcode scanner can read the following barcode types:

- UPC-A
- Code32
- Code11
- MSI

- UPC-E
- Code39
- Codabar

- EAN-8
- Code128
- Industrial 2 of 5

- EAN-13
- Code93
- Interleaved 2 of 5

### To Assign a Barcode to a Program

1. Connect the barcode scanner to the USB port on the dispenser.

2. Press Programs ≣. The Program Library screen opens.

3. Press the **name of a program** (not the program number) you want to add a barcode to. The Program Details screen opens.

4. Press Barcode. The Barcode screen opens.

5. Press Assign Barcode.

6. Use the barcode scanner to scan the barcode. The scanned barcode appears in the Currently Assigned Barcode field.

   NOTE: If a barcode has 8 or fewer digits, all 8 digits are displayed. If a barcode has 9 or more digits, the first three digits are displayed, followed by an ellipsis, and then followed by the last 3 digits (e.g., XXX...XXX).

7. Press Back ‹ to return to the Program Details screen. The barcode is displayed next to Barcode.

   NOTE: The system also adds the barcode information to the program name.

8. Press Home ⌂ to return to the Home screen.
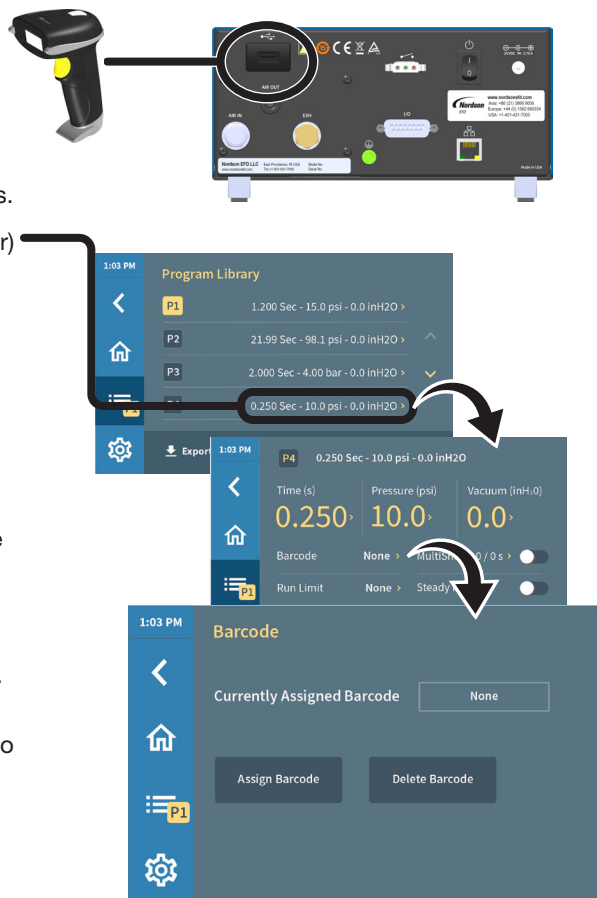
Operation (continued)

Using the Barcode Scanner (continued)

To Run a Barcode Program

1. Scan the barcode. The system switches to the associated program.

2. Position the tip over the correct location on the workpiece.

3. Initiate the dispense cycle.

To Delete a Barcode

1. Open the Program Details screen that includes the barcode you want to delete.

2. Press Barcode. The Barcode screen opens.

3. Press Delete Barcode. The system deletes the barcode association, and also removes the barcode information from the program name.

4. Press Home ⌂ to return to the Home screen.

Operation (continued)

Using the MultiShot Feature

The MultiShot feature allows you to dispense multiple shots with one dispense cycle initiation.

NOTE: This feature is not usually used in an automated dispensing system.

To Enter MultiShot Settings

1. On the Home screen, press MultiShot. The MultiShot screen opens.

2. Press Set MultiShot Count to enter a setting for the number of deposits to make per dispense cycle.

3. Press Back ‹ to return to the MultiShot screen.

4. Press Pause Time (s) to enter a setting for the amount of time to elapse between deposits.

5. Press Back ‹ to return to the MultiShot screen.

Pause Time (s): The time between deposits

Set MultiShot Count: The number of deposits to dispense per cycle (one press of the foot pedal)
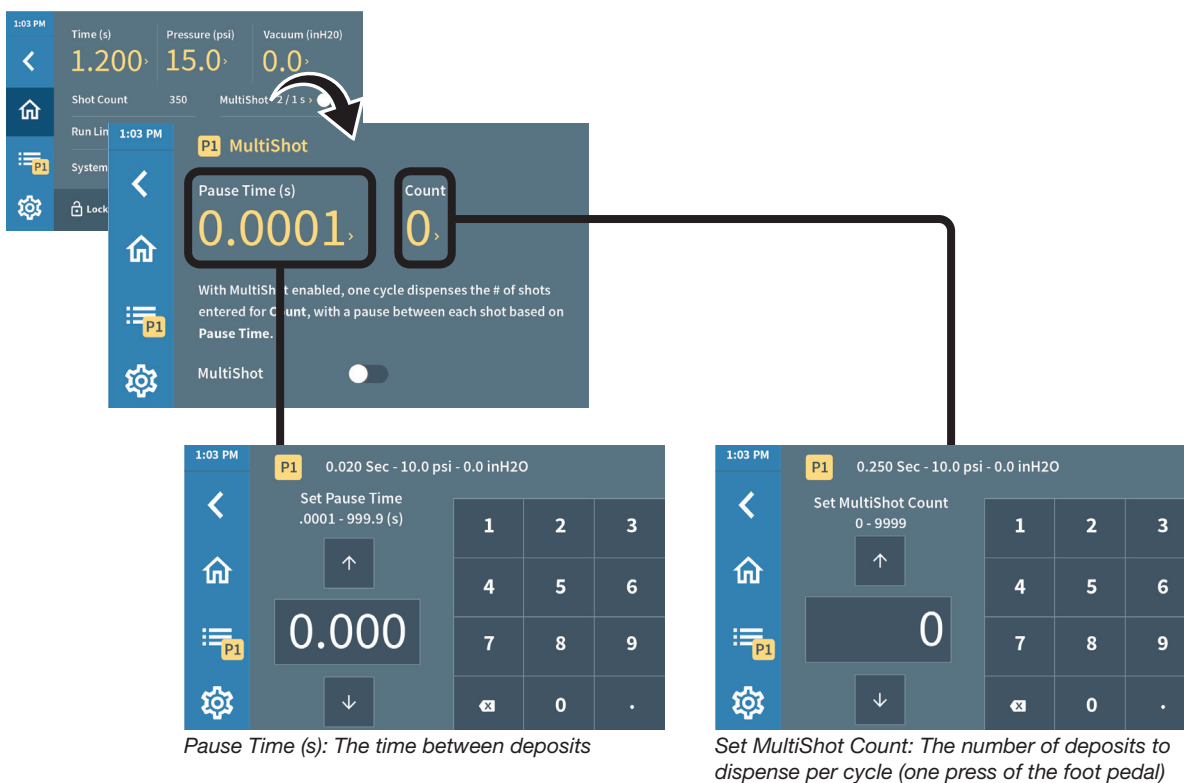
To Use MultiShot Dispensing

1. Move any MultiShot toggle to the ON position.

   NOTE: A MultiShot toggle is provided on the Home, Program Details, and MultiShot screens. The Home screen shows the MultiShot settings and ON / OFF status.

2. To start the MultiShot dispense cycle, press the foot pedal one time.

3. To stop the MultiShot dispense cycle, press the foot pedal again.

4. To disable MultiShot, move any MultiShot toggle to the OFF position.
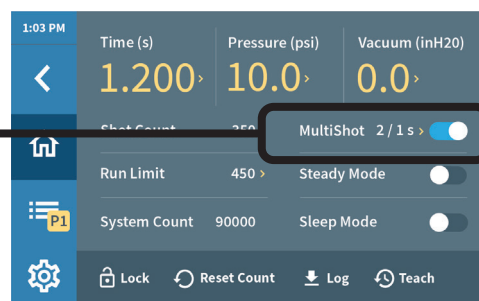
Operation (continued)

Using the Sleep Mode (UltimusPlus I Only)
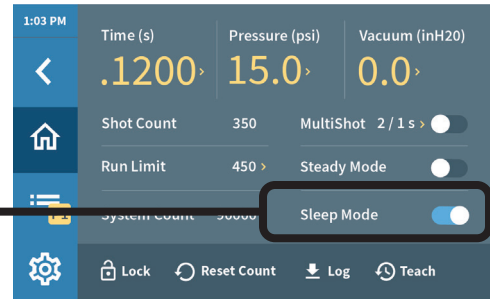
Use the sleep mode to:

- Reduce factory power consumption
- Reduce factory air consumption when vacuum is being used

You can also set how long the system waits before entering the Sleep Mode.

To Enable / Disable the Sleep Mode

On the Home screen, move the Sleep Mode toggle to the ON (enabled) or OFF (disabled) position. You can also enable or disable Sleep Mode on the Sleep Mode screen.

NOTE: Sleep Mode can be enabled only when the pressure is above 1 bar (15 psi). If the pressure drops below 1 bar (15 psi), a warning appears.

To Set the Sleep Mode Timer

1. Press Settings ⚙ > Sleep Mode.

2. Press the button for the amount of time to elapse after the last dispense cycle before the system enters the Sleep Mode.

3. If needed, move the Sleep Mode toggle to the ON (enabled) position.

4. Press Home 🏠 to return to the Home screen.
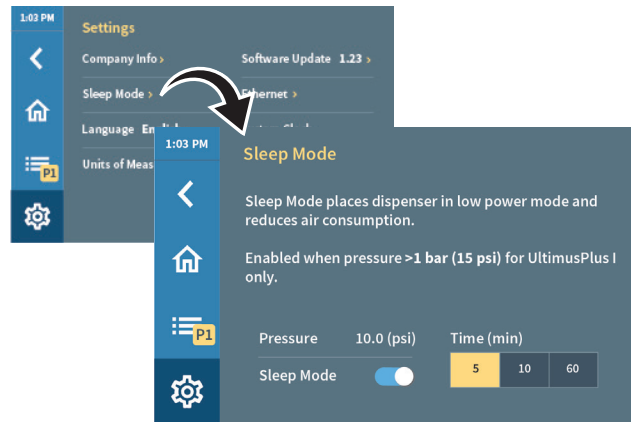
Clearing Alarms

When an alarm occurs, a red warning box appears on the touchscreen. Refer to "Dispenser Warnings" on page 50 to troubleshoot and correct alarm conditions.

Use either of the following methods to clear an alarm:

- Touch (or click, if using a mouse) anywhere on the touchscreen.
- If applicable, toggle the Clear Alarm input (refer to "Clear Alarm Circuit" on page 55 for wiring details).

Example of an alarm

Operation (continued)

Viewing or Exporting the Dispense Log

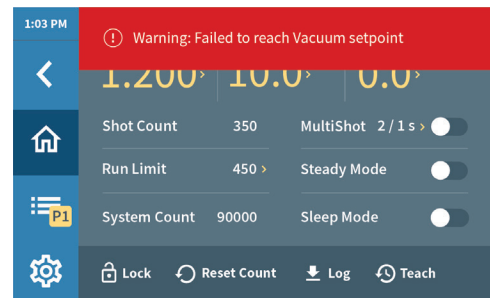The Dispense Log captures dispensing data, including a time stamp.

The system stores up to 100,000 log entries. When the log is nearly full, the system generates a Memory Low warning. When the log capacity is reached, the system generates a Memory Full warning, at which point log entries will no longer be saved. When the system provides a log memory warning, or anytime you want to save the log data, follow this procedure to export the log to a USB drive.

NOTE: On UltimusPlus dispensers connected to the Ethernet, you can use an FTP client application to export the Dispense Log. Refer to "FTP Client Application for Dispense Log Exports" on page 77.

1. Insert a USB drive into the USB port on the dispenser.

2. Press Log ⬇ .

   The Dispense Log screen opens. The screen shows the log capacity used and the number of total log entries.

   NOTE: This screen differs slightly for an UltimusPlus dispenser being operated via the NX web interface.

3. To view the log entries or to free up memory, export the log. Select either Export and Delete Log or Export and Keep Log, as desired.

4. The system exports all log entries to the USB drive.

   NOTE: Dispense log entries are exported as *.csv files and can be opened in Windows® Notepad, Excel™, and other compatible applications.

5. Press Home 🏠 to return to the Home screen.
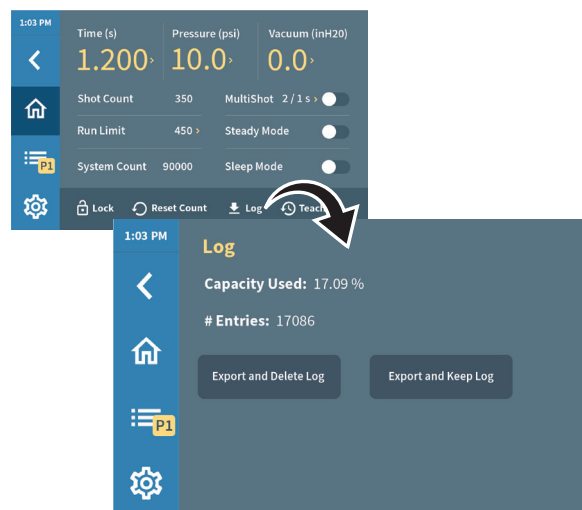
Operation (continued)

Connecting an Ethernet Cable for Factory Integration

The UltimusPlus dispenser can be integrated into a factory system (such as an automated dispensing system), allowing you to remotely switch between programs or initiate a dispense cycle using a basic protocol.

For network connection instructions, go to the UltimusPlus web page.

NOTE: The dispenser must have a unique static IP address. If you need to change the dispenser IP address, refer to "Changing the Dispenser IP Address" on page 41.

Ethernet cable

Ethernet switch
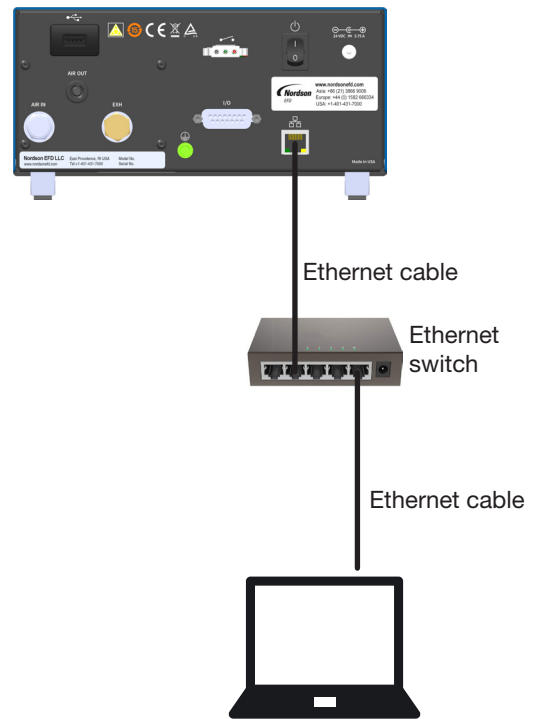
Ethernet cable

Making an Ethernet connection between the UltimusPlus Dispenser and a computer

System Settings

Setting the Language

1. Press Settings ⚙ > Language.

2. Select the desired language:
   - English (default)
   - Chinese
   - French
   - German
   - Japanese
   - Korean
   - Spanish

3. Press Home 🏠 to save the setting and return to the Home screen.
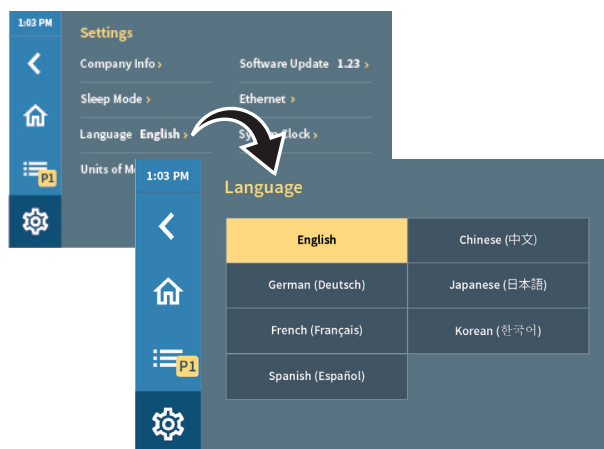
Setting the Units of Measure

1. Press Settings ⚙ > Units of Measure.

2. Select the desired units of measure for Pressure or Vacuum. Refer to "Ranges for All Editable Settings" on page 18 for details on all editable settings.

3. Press Home 🏠 to save the setting and return to the Home screen.
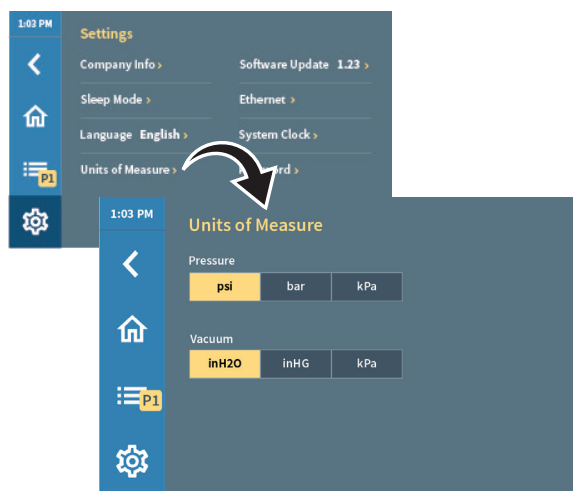
Setting the System Date or Time

NOTE: This screen differs for an UltimusPlus dispenser being operated via the NX web interface. Refer to "System Date or Time on the NX Web Interface" on page 62.

1. Press Settings ⚙ > System Clock.

2. Enter the correct data for Year, Month, Day, or Time. You can also choose to display time based on a 24-hour clock.

   Saved settings are indicated by a check mark ✓, which appears briefly.

3. Press Home 🏠 to save the setting and return to the Home screen.
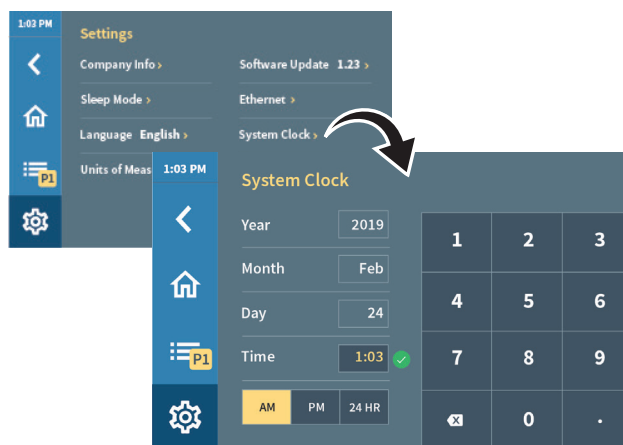
System Settings (continued)

Changing the System Password

> **⚠ CAUTION**
>
> Record the password in a safe place. A fee is required for password recovery.

1. Press Settings ⚙ > Password.

2. Enter the current password.

   NOTE: The default password is 1111.

3. Enter the new password.

4. Re-enter the new password.

   The new password is saved. When the system is locked, the password is required to unlock the system.
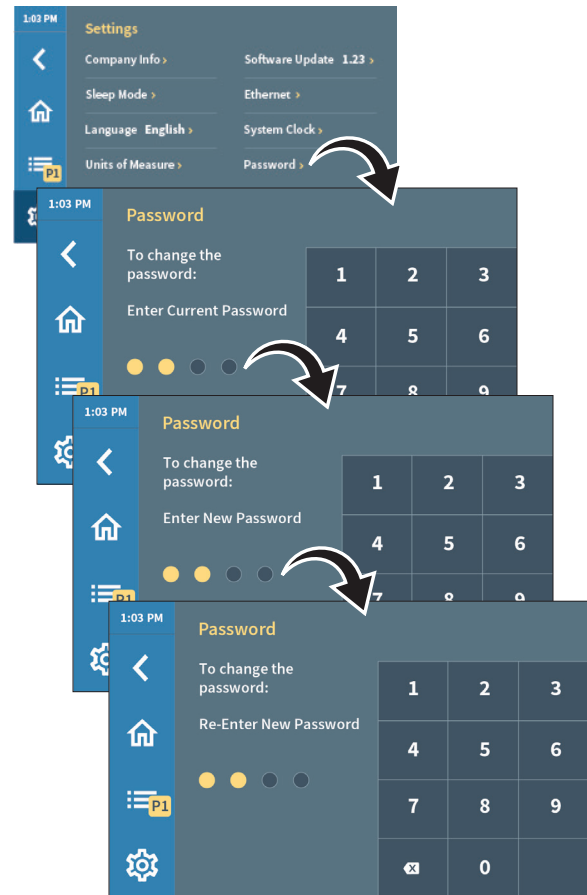
Changing the Dispenser IP Address

The dispenser must have a unique static IP address. If the dispenser is connected to a network that includes another device with the same IP address, follow this procedure to change the IP address of the dispenser. The other connected devices in the system must also have a unique IP address. If you need to change the IP address of a computer, refer to "Appendix A, Changing the IP Address of a Computer" on page 58.

1. Press Settings ⚙ > Ethernet.

   The Ethernet setup screen opens.

2. Make the required changes and then press Apply.

3. Press Home 🏠 to return to the Home screen.
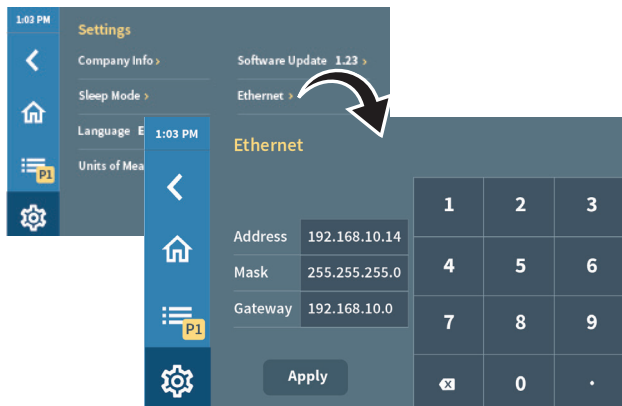
System Settings (continued)

Setting a Run Limit, Viewing the Shot Count or System Count, and Resetting the Shot Count

Shot Count is the number of shots, or deposits, that have been made for a program. This value can be reset to 0.

Run Limit is the maximum number of shots that can be made for a program. This value is editable.

System Count is the total number of shots made by the system in its lifetime. This value is not editable.

All three of these values are shown on the Home screen.
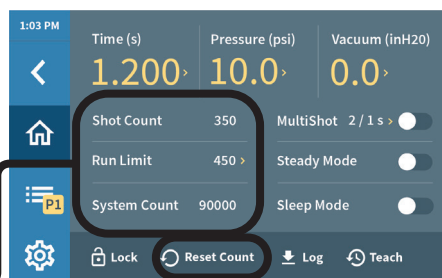
To Reset the Shot Count

Press Reset Count 🔄. The system resets the Shot Count for the currently active program to zero (0).

To Enter a Run Limit

1. Press Programs ☰. The Program Library screen opens.

2. Select the program to edit. The Program Details screen opens.

3. Press Run Limit, then enter the desired setting.

   NOTE: Run Limit can also be adjusted from the Home screen.

4. Press Home 🏠 to return to the Home screen.

System Settings (continued)

Viewing System Information

1. Press Settings ⚙ > Company Info.

2. On this screen you can view the following system information:
   - Telephone numbers
   - Nordson EFD email address
   - Nordson EFD global directory URL
   - Dispenser serial number

3. Press Home ⌂ to return to the Home screen.
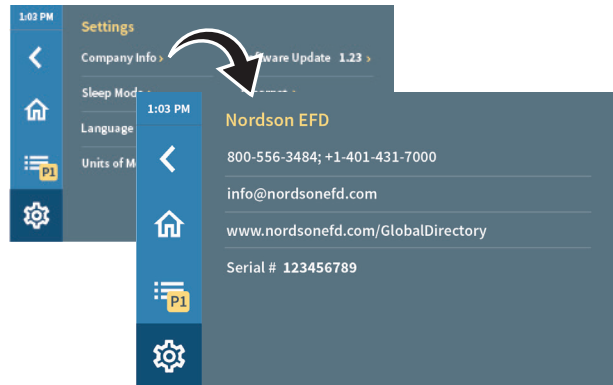
Viewing the Software Version

Current software version

Press Settings ⚙ to open the Settings screen.

The current software version is displayed next to Software Update.
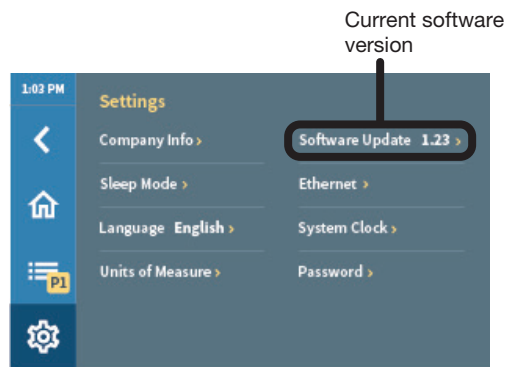
Updating the Software

For software update files and instructions, go to the UltimusPlus web page.

Syringe Barrel Filling

Selecting a Piston

Choose the best piston for your material. Precision molded in six unique styles, Optimum® pistons ensure precise control for virtually any fluid in any application:

- White SmoothFlow (general purpose): For use with most fluids.
- Red SmoothFlow (tight fit): For use with mechanical dispensing equipment.
- Beige SmoothFlow (loose fit): Loose-fitting pistons are used with air-entrapped fluids.
- Orange flatwall: Flat-walled pistons have a looser fit to prevent "bouncing" when dispensing stringy, air-entrapped fluids.
- Blue LV Barrier: LV Barrier pistons are used with cyanoacrylates and very low viscosity fluids.
- Clear Flex: Flex pistons are flexible and reduce "bouncing" in viscous fluids while maintaining excellent wall wiping.

Remember

For best results, EFD strongly recommends the use of a piston as part of your dispensing system.

SmoothFlow piston prevents fluid backflow.

Fumes cannot escape.

No air gap when using the SmoothFlow piston.

If you choose to not use a piston when dispensing thin fluids, remember these important points.

Do not tip the barrel upside down or lay flat. This will cause the liquid to run into the dispenser.

Open
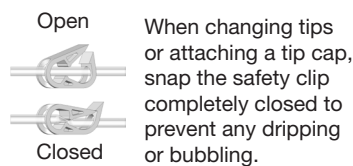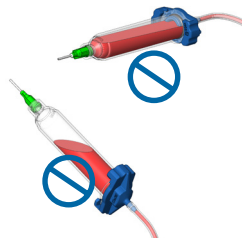
Closed

When changing tips or attaching a tip cap, snap the safety clip completely closed to prevent any dripping or bubbling.

Syringe Barrel Filling (continued)

Filling the Syringe Barrel

NOTE: Refer to the Nordson EFD catalog for filling equipment options, such as the Atlas™ filling system.

⚠ CAUTION

Do not overfill a syringe barrel. Leave room for the piston and adapter. If the installed adapter touches the piston, material will be forced out of the syringe barrel.

⚠ CAUTION

To the greatest extent possible, prevent air from being trapped under the piston. Air trapped under the piston, either mixed uniformly in the material or larger bubbles trapped during the filling process, can cause several dispense problems including, but not limited to, drooling after dispense, piston bouncing, and tunneling of air through thick materials.

Top Filling of Pourable Materials

1. Install the tip cap.

2. Pour material into the syringe barrel to the appropriate fill level, leaving room to install the piston and the adapter.

3. To minimize the formation of trapped air under the piston and to prevent material from leaking past the piston wiper, insert the piston until it fully engages with the material.

    EXCEPTION: If using the Blue LV Barrier piston, fill the syringe barrel to 1/2 of the barrel capacity and position the piston above the fluid and just below the adapter.
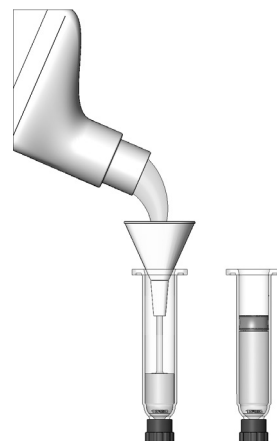
Top Filling of Medium- to High-Viscosity Materials

1. Install the tip cap.

2. Pour material into the syringe barrel to the appropriate fill level, leaving room to install the piston and the adapter. Observe the following guidelines:

    • Transfer material using the best available tools to minimize the formation of air bubbles in the material.

    NOTE: To quickly and efficiently remove entrapped air from material packaged in syringes, consider using a Nordson EFD centrifuge, such as the ProcessMate™ 5000.

    • Take care to minimize the formation of residue on the syringe barrel walls. When a piston is inserted, residue can form a seal at the piston wiper, interfering with proper installation.

3. To minimize trapped air under the piston and to prevent material from leaking past the piston wiper, insert the piston until it fully engages with the material.
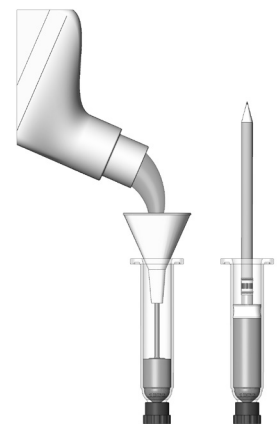
Syringe Barrel Filling (continued)

Bottom Filling of All Materials

1. Insert the piston in the syringe barrel and push it down until it is flush with the bottom of the barrel.

2. Control the flow rate of the material to prevent trapping air bubbles at the barrel shoulder and at the piston wiper. If bubbles are being trapped, the flow rate is probably too fast.

3. Apply steady pressure on the piston to maintain full engagement with the material during fill.

   NOTES:
   - If the material pressure is too high, material can leak past the piston wiper.
   - If the material pressure is too low, the piston may float on the rising material, increasing the possibility of trapped air bubbles under the piston.
   - If either of the above occurs, press down on the piston until it fully engages with the material.

4. Install the tip cap.

Syringe Barrel Filling (continued)

Syringe Barrel Filling Alternatives

Nordson EFD offers productive alternatives to traditional syringe barrel filling methods. Here are a few suggestions that can help keep your work area clean, save time, and reduce the chance of entrapped air in the fluid.

- Use the Atlas™ Filling System, P/N 7022445 (12 fl oz). Pack the fluid into a 2.5 fl oz, 6 fl oz, 12 fl oz, 20 fl oz, or 32 fl oz cartridge as shown. Then place the pre-filled cartridge into the barrel loader. Using air pressure, the barrel loader fills the syringe barrel (with a piston installed) from the bottom up.

  If the fluid comes packed in a 300 ml (1/10 gallon) caulking type cartridge, use the EFD P/N 7022452 filling system.

- If you receive frozen epoxies or other fluids in medical type syringes with a manual plunger, request the EFD luer-to-luer fitting to transfer the material.

Contact an EFD fluid application specialist for additional assistance.

P/N 7022445 (12 fl oz) Atlas Filling System. Also available in 2.5, 6, 20, and 32 fl oz.

P/N 7022452 for pre-filled 300mL (1/10 gal) caulking tubes.

Filling the cartridge for the Atlas Filling System.

Luer-to-luer fitting
P/N 7012606 100 pack
P/N 7014838 1 piece
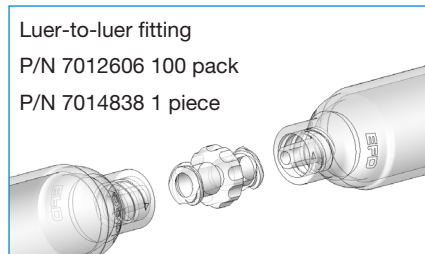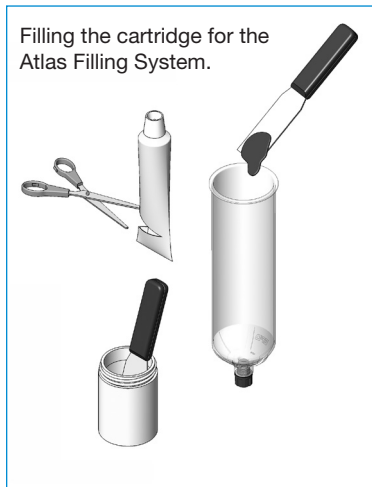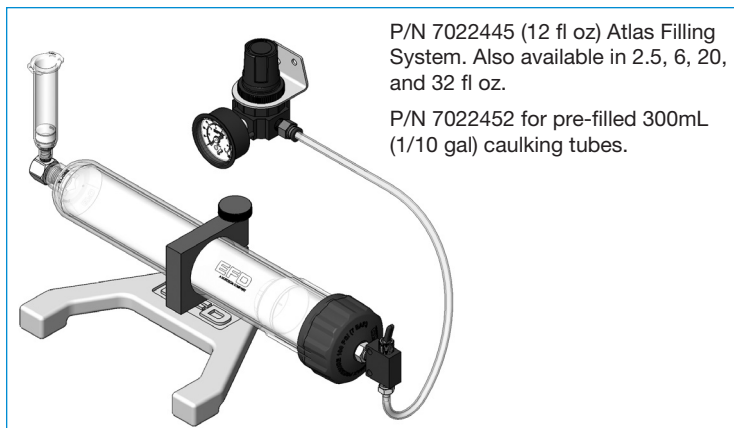
Service

UltimusPlus dispensers require no routine mechanical maintenance.

For the best operating performance, Nordson EFD recommends routinely checking for software updates. For software update files and instructions, go to the UltimusPlus web page.

Part Numbers

Part #	Description
7364361	UltimusPlus I dispenser with NX, 0.7–7.0 bar (10–100 psi) pressure regulator
7364475	UltimusPlus I dispenser with NX, 0.7–7.0 bar (10–100 psi) pressure regulator, calibrated*
7364362	UltimusPlus II dispenser with NX, 0.02–1.0 bar (0.3–15 psi) pressure regulator
7364476	UltimusPlus II dispenser with NX, 0.02–1.0 bar (0.3–15 psi) pressure regulator, calibrated*
7014871	Kit, power cord,** American plug
7014872	Kit, power cord,** European plug

*Calibrated to EFD specifications based on NIST standards
**Ordered separately.

Accessories

See the Dispenser Accessories data sheet for a complete list of optional accessories that will maximize the performance of your dispenser. Visit www.nordsonefd.com/DispenserAccessories for details.

Replacement Parts

NOTE: Refer to the Nordson EFD catalog for Optimum components, including syringe barrels, pistons, dispensing tips, and tip caps.

Part #	Description
7365770	UltimusPlus I display (includes display and bezel)
7365771	UltimusPlus II display (includes display and bezel)
7365772	Dispenser cover (includes sound pads)
7365773	Chassis front and back feet and associated screws
7014865	Foot pedal assembly
7365722	Kit, power supply, 24V, 90 W, 2.5 x 5.5 mm
7365774	Electrical components: • Power switch • DC power cord • Internal display board power cable • Internal foot pedal cable • USB-A to female-panel-mount USB-A cable • 2-port USB hub to USB-A cable • USB-A to USB mini-B cable

Troubleshooting

NOTE: The Dispense Log captures fault events. Refer to "Viewing or Exporting the Dispense Log" on page 38 for detailed information about exporting the log to view the captured log data.

Dispenser Warnings

Problem	Possible Cause	Corrective Action
Log memory low	Dispense Log nearing full capacity	Export and purge the Dispense Log. Refer to "Viewing or Exporting the Dispense Log" on page 38.
Log memory full	Dispense Log full	Export and purge the Dispense Log. Refer to "Viewing or Exporting the Dispense Log" on page 38.
Run limit reached	System has reached the value entered for Run Limit	Reset the Shot Count or change the Run Limit value. Refer to "Setting a Run Limit, Viewing the Shot Count or System Count, and Resetting the Shot Count" on page 42.
Sleep Mode pressure warning	Pressure too low for unit to enter Sleep Mode	For the unit to enter the Sleep Mode, the pressure must be above 1.0 bar (15 psi). This is a precaution to prevent the dripping of low viscosity materials from a syringe barrel.
Failed to reach Vacuum setpoint (dispenser unable to reach Vacuum setpoint during a dispense cycle)	Factory air supply pressure too low	Check the main air supply and primary regulator. Refer to the specifications for the required air supply to the dispenser.
	System not sealed	Check for air leaks in the tubing.
	Blocked muffler / exhaust	Remove and clean the muffler. Check the tubing and clear any blockage.
Export failed (*.ult file failed to export from dispenser)	USB drive full	Use an empty USB drive.
	Problem with USB drive	Check the USB drive to ensure it is functioning properly.
	USB drive not properly inserted	Ensure that the USB drive is correctly inserted in the USB port.
Import failed (*.ult file failed to import to dispenser)	Problem with USB drive	Check the USB drive to ensure it is functioning properly.
	USB drive not properly inserted	Ensure that the USB drive is correctly inserted in the USB port.
More than one .ult file found	Dispenser detected more than one *.ult file on a USB drive	Ensure that only one *.ult file is present on a USB drive.

Continued on next page

Troubleshooting (continued)

Dispenser Warnings (continued)

Problem	Possible Cause	Corrective Action
No .ult file found	Dispenser did not detect an *.ult file on a USB drive	Check the *.ult file on the USB drive. The file must be in the root directory and not inside a folder.
No update file found	Dispenser did not find software update file on USB drive inserted into USB port	Remove the USB drive from the dispenser port and check for the presence of a software update file. If needed, reload the software update file on the USB drive.
Update file corrupted	Software update file on USB drive is corrupt	Remove the USB drive from the dispenser port, obtain a new software update file, and repeat the software update process.
Decryption failed	Software update failed	Remove the USB drive from the dispenser port, obtain a new software update file, and repeat the software update process.
Alarm In (Emergency Stop) signal high	Active (high) Emergency Stop signal to I/O port is blocking dispense cycle initiation	Check the Emergency Stop (E-stop) signal to the I/O port on the dispenser; if the E-stop signal is active, stop the signal. To clear the alarm, touch (or click, if using a mouse) anywhere on the touchscreen. In an automated dispensing system, after the E-stop alarm signal stops, send a Clear Alarm signal to the robot to clear the E-stop alarm. Refer to "Clear Alarm Circuit" on page 55 for details.

Electrical or Software Problems

Problem	Possible Cause	Corrective Action
No power	Power input not connected	Check the power supply connection and DC power supply to the unit.
	Power off	Ensure that the dispenser power switch is ON.
Voltage initiate does not function	Incorrect voltage initiate connections	Verify that the applied signal to the voltage initiate pins of the I/O port is 24 VDC. Refer to "Voltage Initiate Circuit" on page 54 for details.
System will not accept an entered value	Value is outside allowable range	Entered values must be within the allowable settings range. Refer to "Ranges for All Editable Settings" on page 18.

Troubleshooting (continued)

Mechanical or Material Output Problems

Problem	Possible Cause	Corrective Action
No fluid being dispensed	Pressure too low	If dispensing thicker materials, try increasing output air pressure slightly.
	Vacuum too high	Reduce the vacuum setting.
	Safety clip closed	Ensure that the barrel adapter safety clip is not clamped shut.
Inconsistent output	Dispensing tip or barrel clogged, or material contaminated	Check the dispensing tip, barrel, and material for possible contamination or clogs. **NOTE:** Dispensing system components are disposable. Do not attempt to reuse.
	Fluctuating factory air supply	Check the factory air supply for pressure fluctuations and correct as necessary.
	Trapped air in the fluid path	Air bubbles in the fluid path and entrapped air within the fluid can cause inconsistency. For the best dispensing results, remove all entrapped air before dispensing by purging the tip.
	Vacuum too high	Reduce the vacuum setting.
	Safety clip closed	Ensure that the barrel adapter safety clip is not clamped shut.
Material suck-back	Dispensing without a piston	Always use an appropriate piston to prevent material from being drawn back into the dispenser. For thick- to medium-viscosity fluids, use EFD SmoothFlow pistons. For thin, low-viscosity fluids, use EFD LV Barrier pistons.

Technical Data

I/O Port Pin Assignments

If desired, you can connect inputs / output to the I/O port on the back of the dispenser.

- All outputs are 24 VDC, 100 mA maximum
- Inputs / outputs can use either the courtesy 24 VDC power source at pin 15 or an external 24 VDC source.

Refer to "Input / Output Connections" on page 54 for detailed information and wiring diagrams.

I/O Pin	Direction	Assignment
1	Input	E_Stop (+)
2	Input	E_Stop (-)
3	Input	Clear_IN (+)
4	Input	Clear_IN (-)
5	Input	Ex_Trig_IN (+)
6	Input	Ex_Trig_IN (-)
7	Output	Alarm_OUT
8	Output	EOC_OUT
9	Input	Contact_Closure (+)
10	Input	Contact_Closure (-)
11	Input	Program Selector (+)
12	Input	Program Selector (-)
13	n/a	Not Connected
14	n/a	Common
15	n/a	+24V_PWR (courtesy +24V power source)
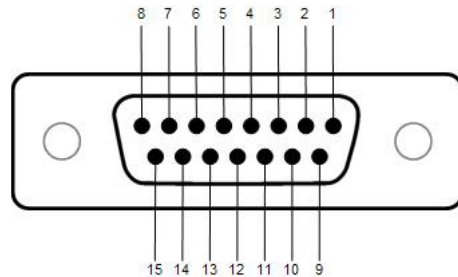
Input / Output Connections

Voltage Initiate Circuit

A dispense cycle can be initiated by a 24 VDC signal across D-Sub connector pins 5 and 6. The signal can be momentary (no less than 0.01 seconds) or maintained. A new dispense cycle will begin after the signal is removed and then applied again.
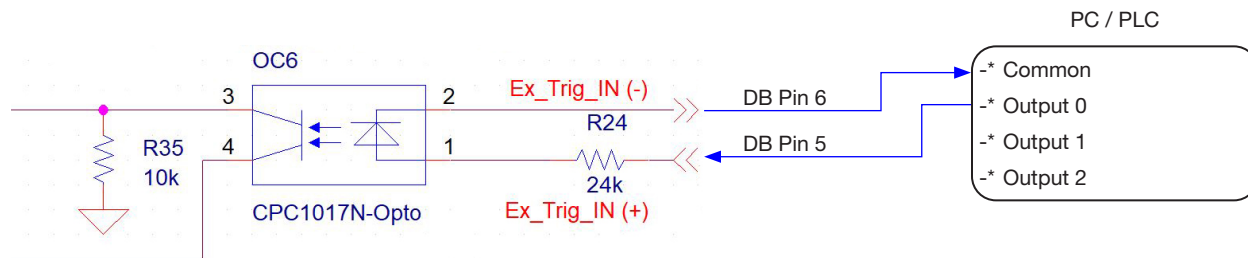
Program Selector Circuit

The active program number can be incremented by initiating a 24 VDC signal across D-Sub connector pins 11 and 12. The signal can be momentary (no less than 0.1 seconds) or maintained. The active program number increments on each rising edge signal. P1 (Program 1) will change to P2, then to P3, and so on, up to P16. If the program selector signal is initiated when P16 is the active program, then the active program returns to P1.
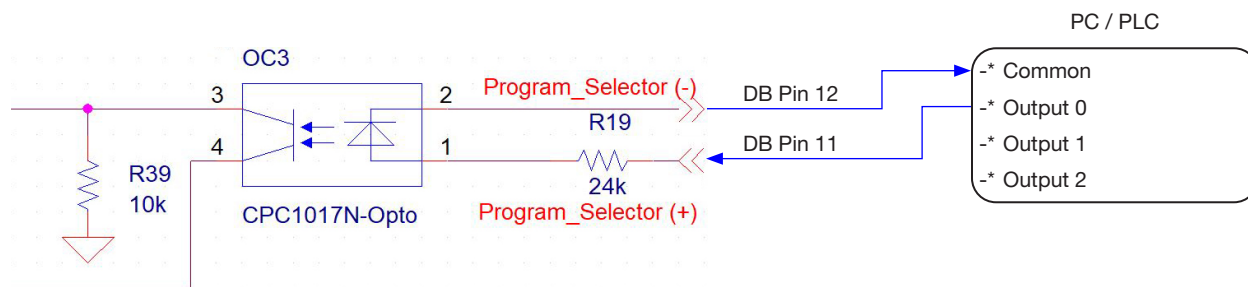
Input / Output Connections (continued)

Emergency Stop (E-Stop) Circuit

The UltimusPlus dispenser can be emergency stopped via I/O from an external source by initiating a 24 VDC signal across D-Sub connector pins 1 and 2. The signal can be momentary (no less than 0.1 seconds) or maintained. The signal will remain in E-stop if held in a high state.

When an E-stop occurs:
- The dispenser stops attempting to regulate pressure
- The output alarm signal from the dispensers goes high
- An red warning box appears on the touchscreen

The dispenser will stay in E-stop mode until either of the following occurs:
- The alarm is cleared by touching (or clicking) anywhere on the touchscreen.
- The Clear Alarm I/O is toggled
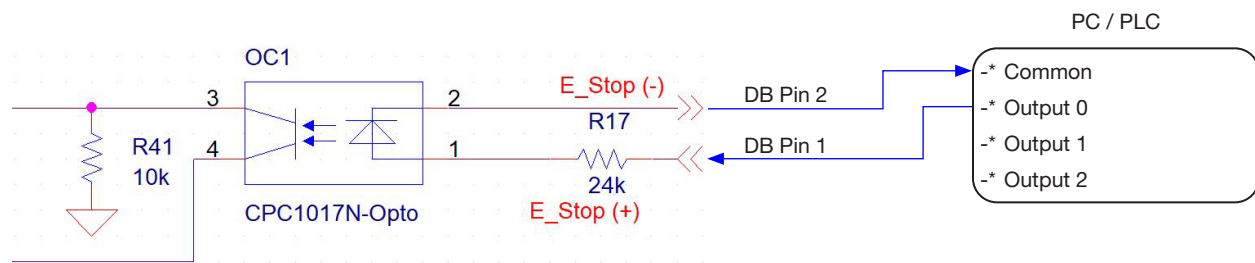
Clear Alarm Circuit

A dispenser alarm or emergency stop can be cleared via I/O from an external source by initiating with a 24 VDC signal across D-Sub connector pins 3 and 4. The signal can be momentary (no less than 0.1 seconds) or maintained.
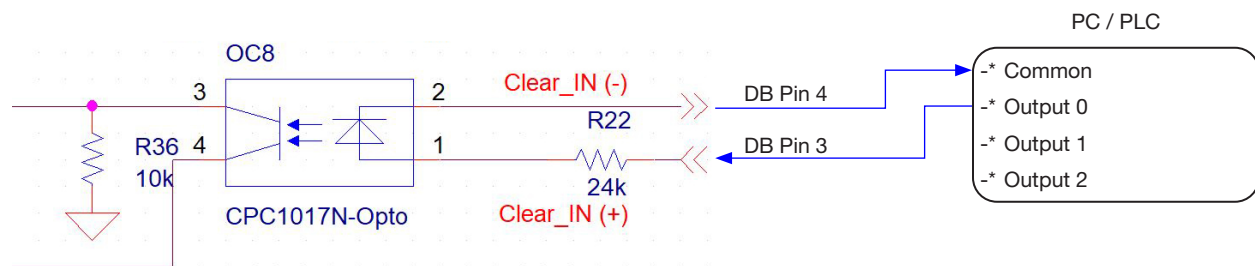
Input / Output Connections (continued)

Alarm Out Circuit

The UltimusPlus dispenser can alert external devices if it enters an alarm state; this is accomplished by creating a logic high 24 VDC signal between D-Sub connector pins 7 and 14 (DC Common). The signal remains high as long as the dispenser is in an alarm state, preventing dispensing.

When a dispenser alarm occurs:
- The dispenser prevents any dispense cycles from occurring
- An red warning box appears on the touchscreen

The dispenser will stay in the alarm state until either of the following occurs:
- The alarm is cleared by touching (or clicking) anywhere on the touchscreen.
- The Clear Alarm I/O is toggled (refer to "Clear Alarm Circuit" on page 55).
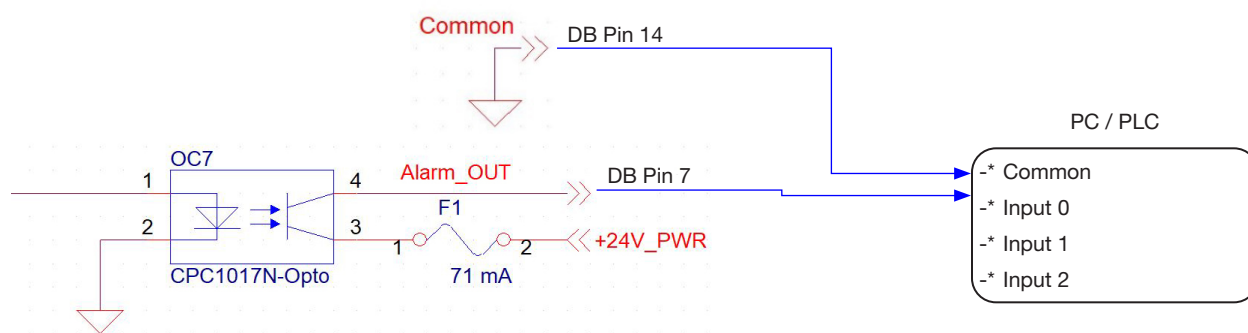
End-of-Cycle Feedback Circuit

The UltimusPlus dispenser can send an End-of-Cycle (EOC) feedback signal to an external source. The 24 VDC EOC output signal is active low during dispensing across D-Sub connector pins 8 and 14 (DC common). The EOC feedback can be used by external equipment to acknowledge an active dispense cycle.
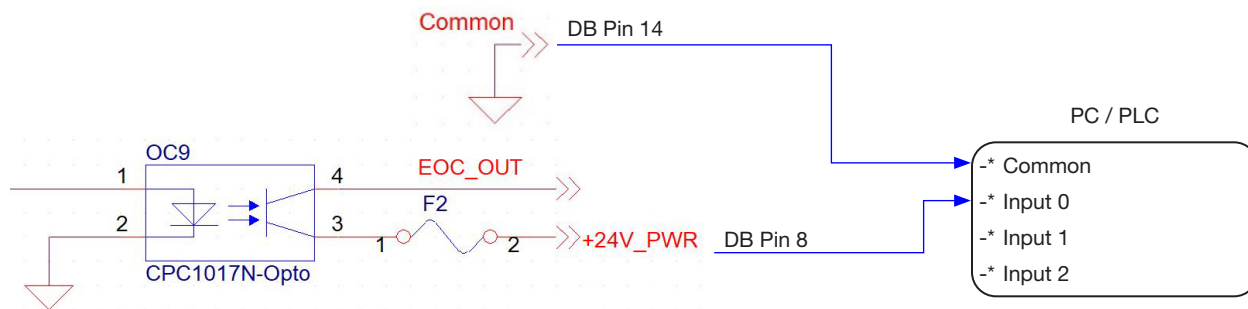
Input / Output Connections (continued)

Contact Closure Circuit

A dispense cycle can be initiated with a contact closure via a 24 VDC signal across D-Sub connector pins 9 and 10. The signal can be momentary (no less than 0.01 seconds) or maintained. A new dispense cycle will begin after the signal is removed and then applied again.
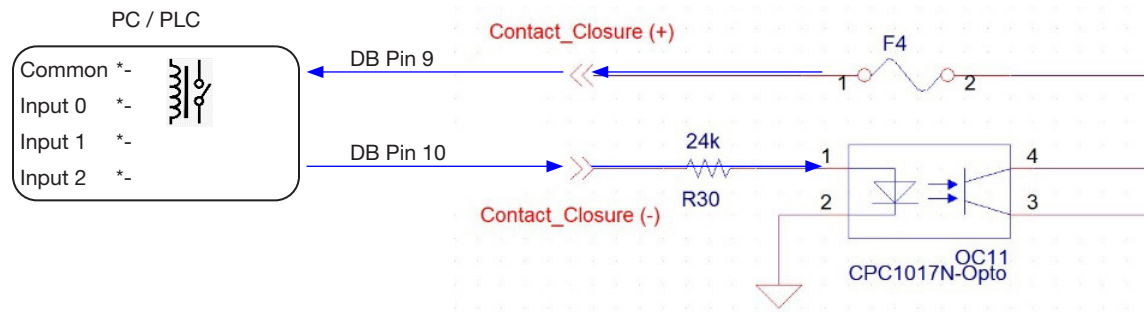
Appendix A, Changing the IP Address of a Computer

Each computer in a networked system must have a unique IP address. Follow this procedure to change the IP address of a computer.

NOTE: To change the IP address of the dispenser, refer to "Changing the Dispenser IP Address" on page 41.

1. On your computer, navigate to the "Network and Sharing Center."

2. Click "Change Adapter Settings."
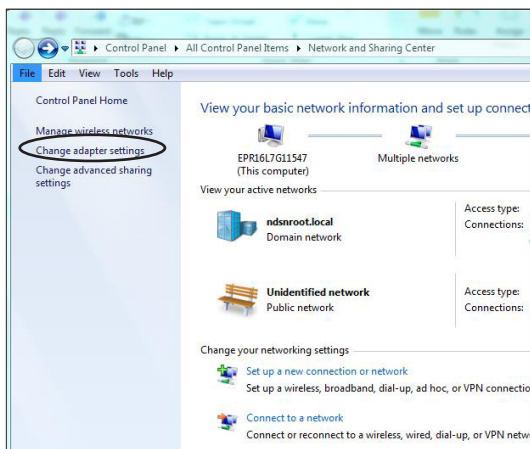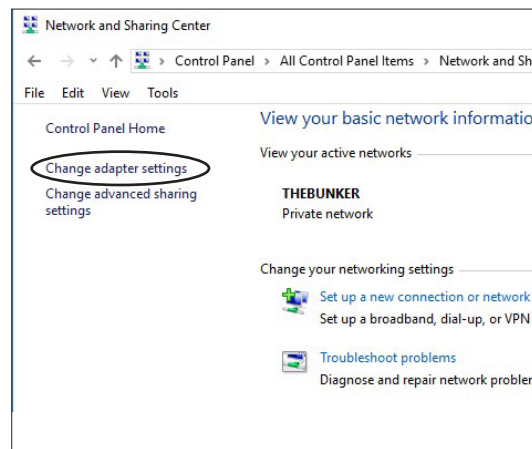
Windows® 7   *Windows 10*

3. Select "Local Area Connection" (Windows 7) or "Ethernet" (Windows 10).
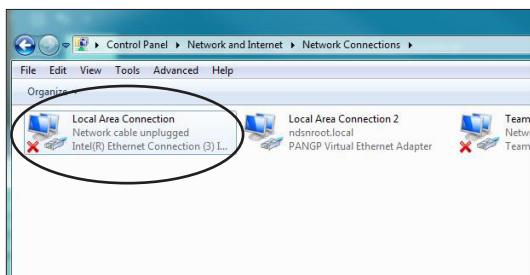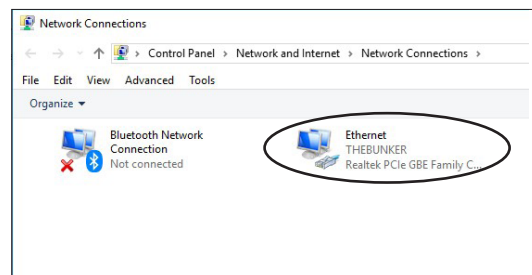
Windows 7   *Windows 10*

4. Double-click (Windows 7) or right-click (Windows 10) to select "Properties."
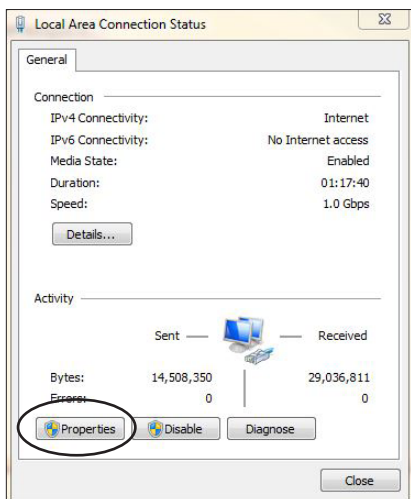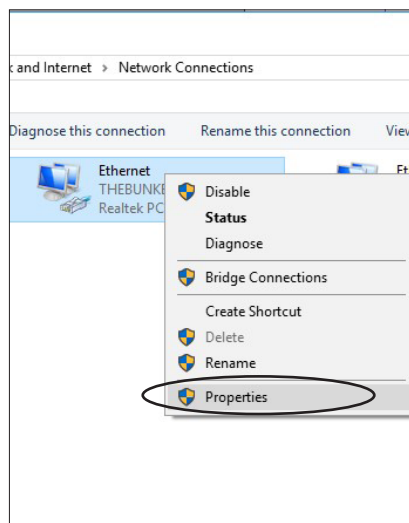
Windows 7   *Windows 10*

Appendix A, Changing the IP Address of a Computer (continued)

5. Double-click "Internet Protocol Version 4 (TCP/IPv4)."
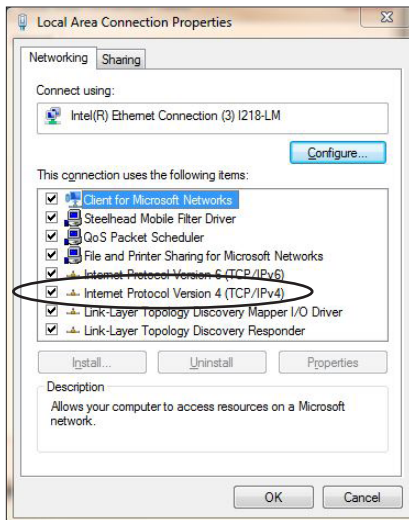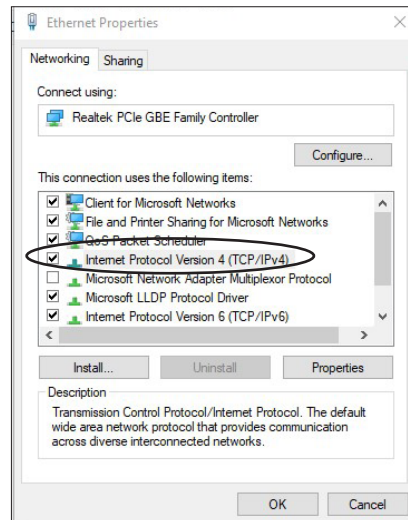
Windows 7   *Windows 10*

6. Click "Use the following IP address" and then enter the desired IP address.

   NOTE: The digit range for each field is 1–255.

7. Click OK > OK to save the new IP address.
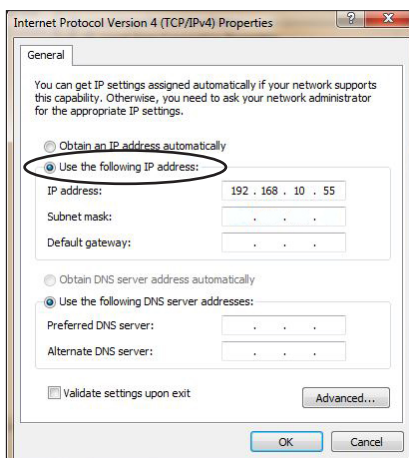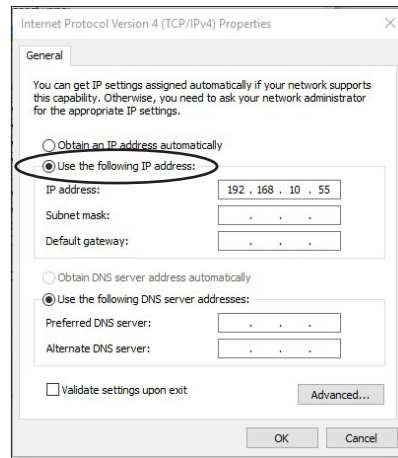
Windows 7   *Windows 10*

Appendix B, Remote Communication

This appendix provides information specific to the NX protocol, FTP, and HTTP capabilities of the dispenser. These capabilities allow direct communication with a PLC, PC, or other plant controller via Ethernet, providing complete remote control of a dispenser from the connected devices.

NOTE: In this appendix, a connected device is referred to as the Client.

Once the UltimusPlus dispenser and the Client are on the same network, the following graphical user interfaces (GUIs) are available:

• To facilitate TCP/IP implementation and development of your own PLC application, the Windows-based **Nordson NX Client Application** can be used to enable remote connectivity with the UltimusPlus dispenser, to modify program settings, and to control dispenser operation.

• The **NX web interface** accessed via HTTP allows remote control of an UltimusPlus dispenser using a web browser (such as Firefox™ or Google Chrome™) on a PC or tablet.

• An **FTP client application** can be used to export the Dispense Log to a connected device. For example, this feature is useful if you want to set up your system to automatically export the Dispense Log at the end of every shift.

Dispenser and Client Setup

1. Connect an Ethernet cable between the Ethernet port on the UltimusPlus dispenser and the Clients (usually a PLC and / or PC), using Ethernet switches in between the connections. A typical setup is shown below.
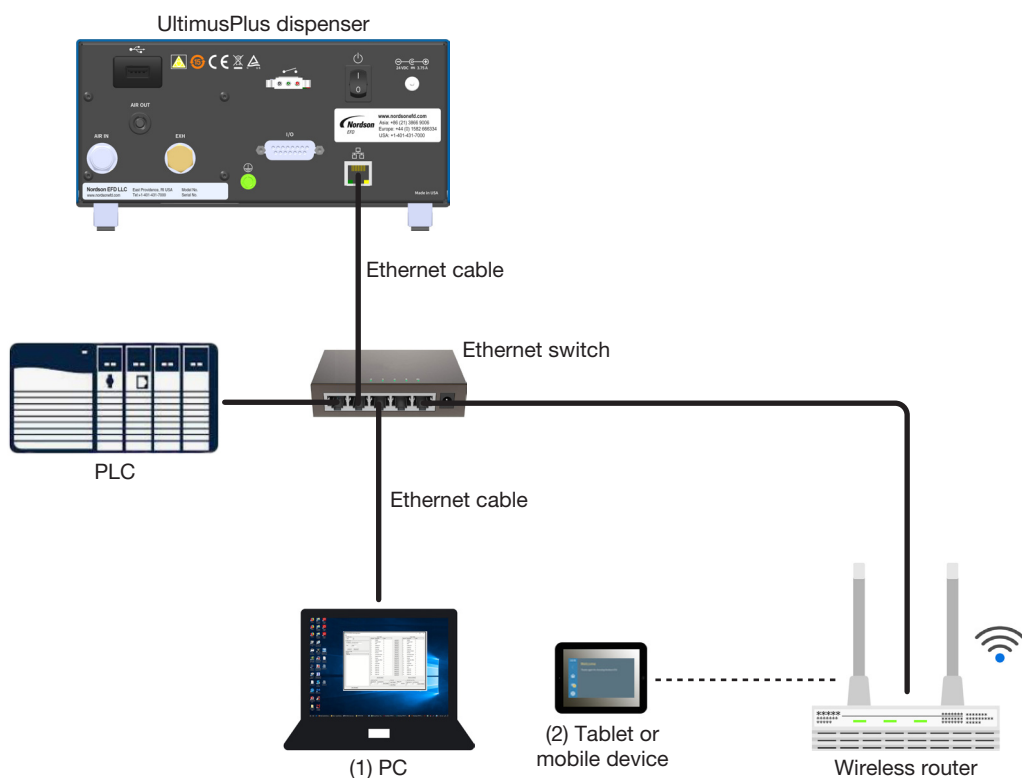
Typical setup for UltimusPlus dispenser connectivity:
(1) Nordson NX Client Application open on a PC
(2) NX web interface open on a tablet or mobile device

Appendix B, Remote Communication (continued)

Dispenser and Client Setup (continued)

2. Switch ON the UltimusPlus dispenser and the Client.

3. Use IPv4 (TCP/IP version 4) to set up Client with a static IP address on the same subnet as the UltimusPlus IP address, but using a different IP address from the UltimusPlus dispenser.

   NOTE: Additional details for IP address setup on a PC are provided in "Appendix A, Changing the IP Address of a Computer" on page 58.
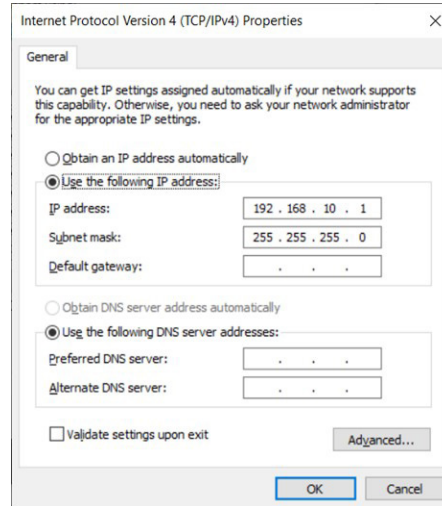
4. On the touchscreen interface, press Settings ⚙ > Ethernet.

   The Ethernet setup screen opens.

5. Ensure that the Address of the UltimusPlus dispenser is set to 192.168.10.42.

6. Press Home ⌂ to return to the Home screen.

NOTES:

- The IP address of the Client must be in the same subnet as the UltimusPlus IP address.

- Only one Client at a time can be connected to an UltimusPlus dispenser. The connection of multiple clients at a time is not supported. If Client 1 is already connected and Client 2 requests a connection, then Client 1 will be disconnected and the Client 2 connection will be established.
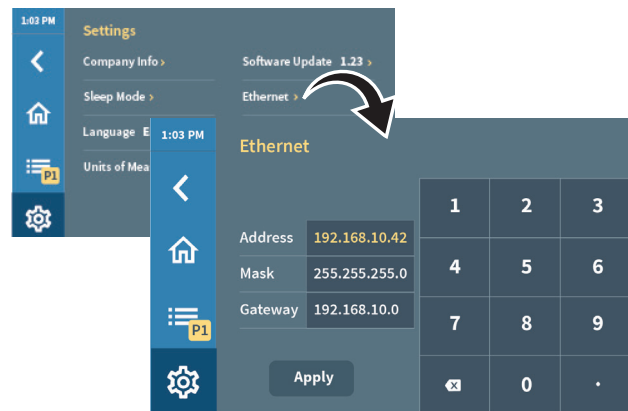
Appendix B, Remote Communication (continued)

NX Web Interface for Remote Control of an UltimusPlus Dispenser

Once an UltimusPlus dispenser and Client are on the same network, the NX web interface, which mimics the UltimusPlus dispenser's touchscreen interface, is available through a web browser (such as Firefox or Google Chrome). You can use the NX web interface to remotely control the connected UltimusPlus dispenser.

1. Ensure that the UltimusPlus dispenser and Client network is properly connected as described under "Dispenser and Client Setup" on page 60.

2. Using a compatible web browser (such as Firefox or Google Chrome), navigate to the IP address of the UltimusPlus dispenser followed by :8088/.

   Example: http://192.168.10.42:8088/
   NOTE: In some browsers it may be necessary to type out the full URL.

   The Welcome page of the UltimusPlus dispenser touchscreen opens.

3. Refer to the main sections of this manual for detailed operating procedures.

UltimusPlus dispenser

Ethernet cable

Ethernet switch

Ethernet cable

Wireless router
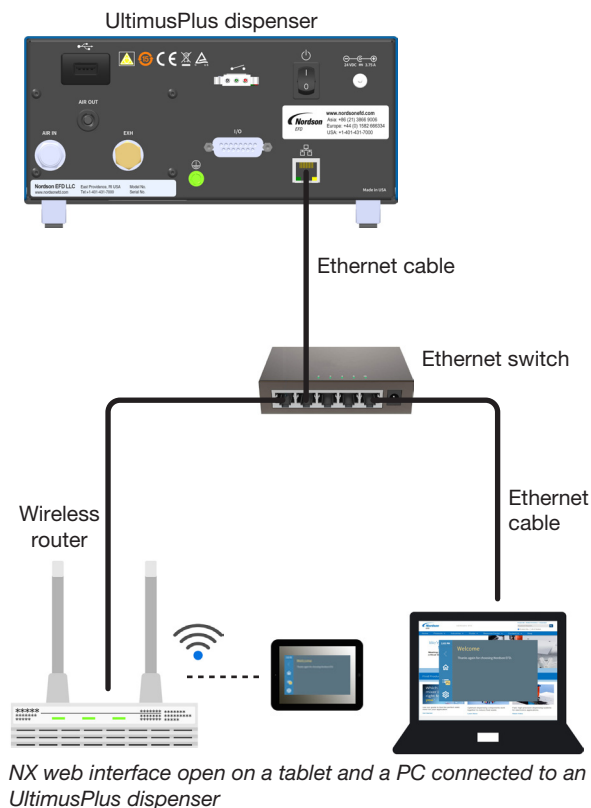
NX web interface open on a tablet and a PC connected to an UltimusPlus dispenser

System Date or Time on the NX Web Interface

1. Press Settings ⚙ > System Clock.

2. Press Synchronize to Local Time.

   The NX web interface synchronizes the connected dispenser to the date and time settings of the Client.

3. Press Home 🏠 to return to the Home screen.
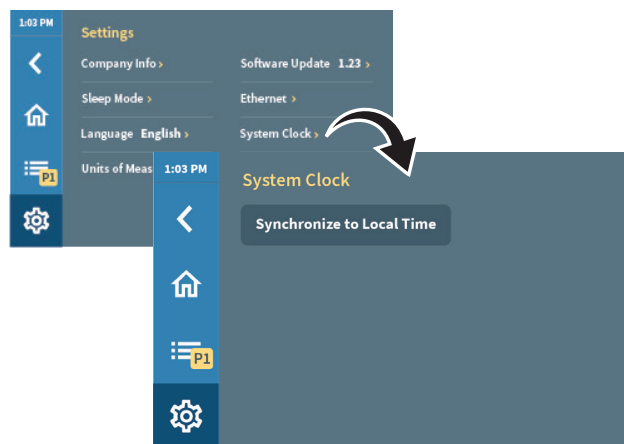
Appendix B, Remote Communication (continued)

Nordson NX Client Application for NX Protocol Implementation

The Nordson NX Client Application shows how the dispenser settings (registers) can be written to fully control an UltimusPlus dispenser using the NX protocol, thus allowing a greater understanding of the communication process. You can use the Nordson NX Client Application to facilitate the implementation and development of your own PLC application.

To Install and Open the Nordson NX Client Application

1. Download the Nordson NX Client Application from the UltimusPlus web page.

2. Extract the Nordson NX Client Application on the PC connected to the UltimusPlus dispenser(s).

3. Open the executable file located inside the extracted folder. Continue to "About the Nordson NX Client Application" on page 64.
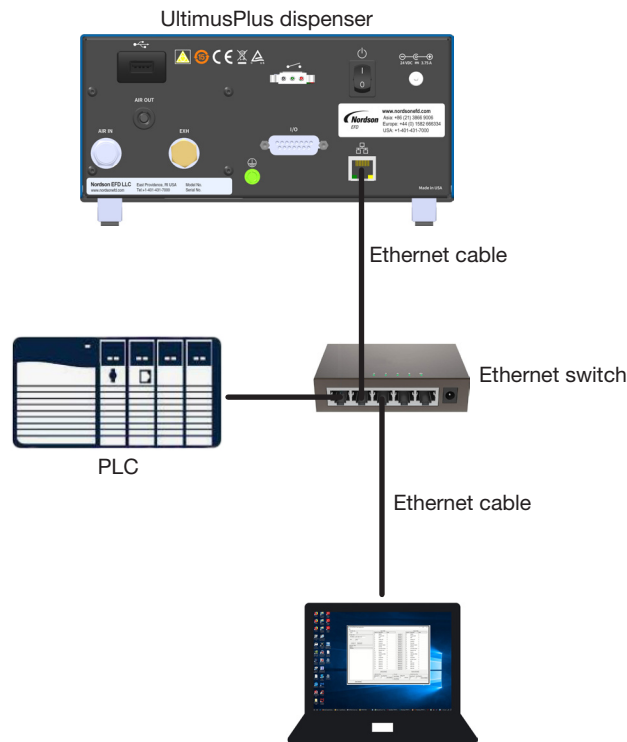
Nordson NX Client Application open on a PC connected to an UltimusPlus dispenser

Appendix B, Remote Communication (continued)

Nordson NX Client Application for NX Protocol Implementation (continued)

About the Nordson NX Client Application

Refer to "To Use the Nordson NX Client Application" on page 65 to run and use the Nordson NX Client Application.

- There are two register tables for monitoring and controlling dispenser parameters — the Input Table and the Output Table.

- Each parameter is assigned a register number (Reg. No) and a register name (Reg Name). Refer to "Register Set for the NX Protocol" on page 67.

- The Input Table is used to control the dispenser parameters. Currently, 11 registers are in use in the Input Table; other registers are reserved for future use.

- The Output Table is used to monitor the dispenser parameters. Currently, 17 registers are in use in the Output Table; other registers are reserved for future use.

- The first register for both the Input Table and the Output Table is index 0 (Register Name = Digitals).

- The Nordson NX Client Application can poll the Output Table registers periodically for continuous monitoring of the dispenser parameters. The polling time is user-adjustable. The lowest polling time is 0.1 s.

- The Nordson NX Client Application can send either one or multiple registers at once.

EXAMPLES:

- SEND RX is used to send one register datum to the dispenser.

- SEND MULTIPLE is used to send multiple registers in single command. Enter the base register (Reg. No.: 0 to 19) and the number of registers to be sent (1 to 20). The base address and number of registers must fit within the maximum available 20 registers.

- SEND ALL VALUES is used to send all 20 registers in a single command. In this case, the base register will be 0 (zero) and the number of registers will be 20.

  NOTE: Sending one register or sending all registers are both special cases in which multiple registers are sent.

- To update a parameter, enter new data in the Value field of the Input Table. Allow a change to persist for at least 15 ms for proper update in the Input Table.

- Read multiple registers by entering the base register (Reg. No.: 0 to 19) and the number of registers to read under RECEIVE MULTIPLE. The rules for setting the base register and the number of registers are the same as mentioned above.

- To continue to poll the Output Table, enter the polling time in seconds (minimum polling time is 0.1 s) under POLLING and click START POLLING. Note that this is a function in the Nordson NX Client Application, so any custom application will need its own polling implementation.

- The Diagnostic Table is used to monitor the received messages / responses from the dispenser for diagnostic and educational purposes.

- All TCP packets are sent and received with a semicolon (;) as the termination character at the end of the packet.

Appendix B, Remote Communication (continued)

Nordson NX Client Application for NX Protocol Implementation (continued)

To Use the Nordson NX Client Application
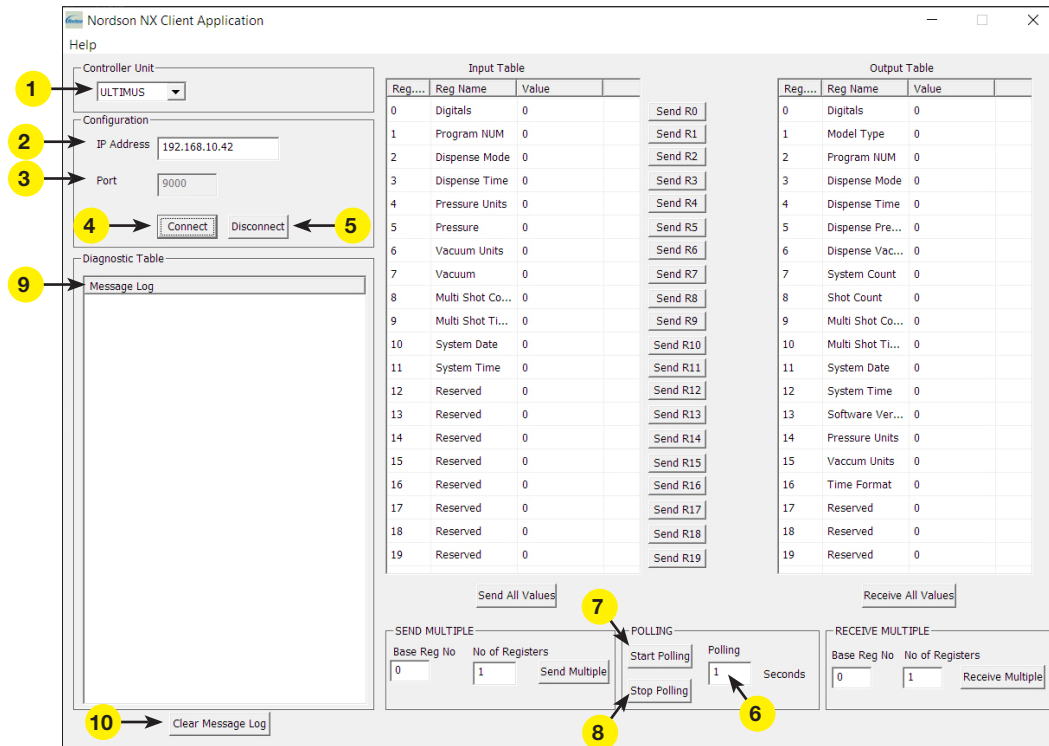
Item	Field	Description
1	Controller Unit	Select ULTIMUS.
2	IP Address	Enter the IP ADDRESS for the UltimusPlus dispenser to communicate with.
3	Port	Ensure that PORT is 9000.
4	Connect	Click to activate the connection to the controller.
5	Disconnect	Click to deactivate the connection to the controller.
6	Polling Time (Seconds)	Enter the desired polling time. This is how long at a time the application reads the data from the dispenser. The range of possible values is 0.1 to 5.0 seconds (s).
7	Start Polling	Click to start reading data from the dispenser.
8	Stop Polling	Click to stop reading data from the dispenser.
9	Test Log	When polling is active, the Test Log shows the current values stored in the registers (the raw data received from the dispenser).
10	Clear Messages	Click to clear the Test Log.

Appendix B, Remote Communication (continued)

Nordson NX Client Application for NX Protocol Implementation (continued)

To Use the Nordson NX Client Application (continued)
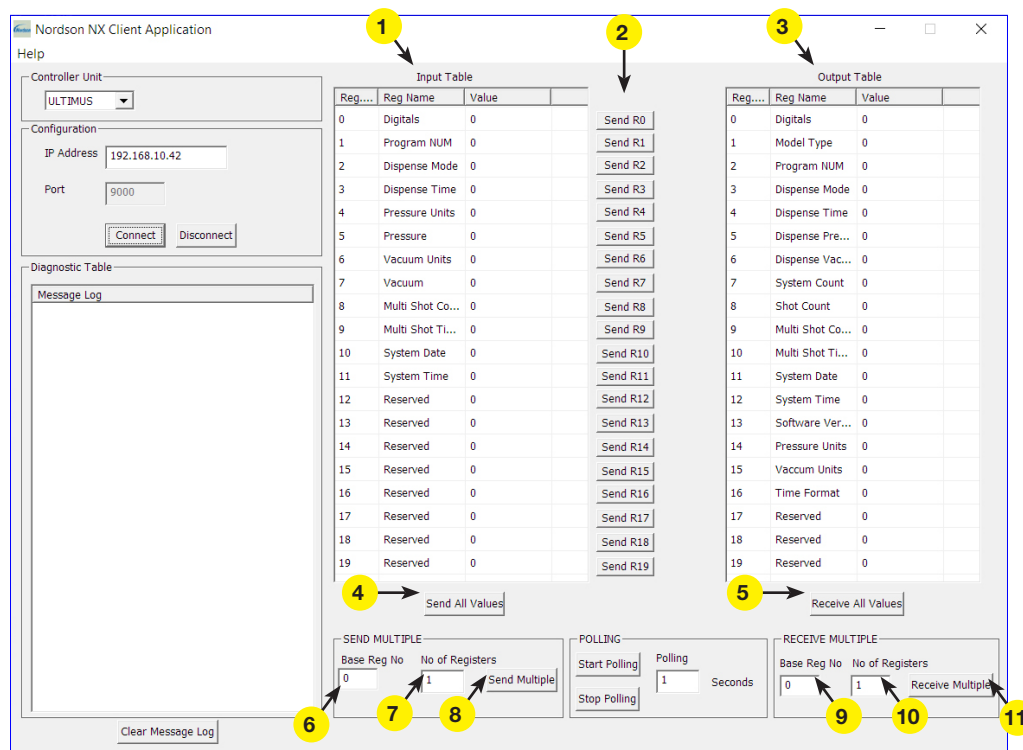
Item	Field	Description
1	Input Table	Write data register set. Under Value, enter the write command values to send to the dispenser.
2	Send Rx	Click to write the selected register value to the dispenser.
3	Output Table	Read data from the dispenser; shows the currently active register settings.
4	Send All Values	Click to send all values entered in the Input Table to the dispenser.
5	Receive All Values	Click to read all values from the dispenser. The Output Table updates to show the currently active register settings.
6	Send Multiple: Base Reg No	To send a string of registers to the dispenser, enter a starting register number (Reg No under Input Table).
7	Send Multiple: No of Registers	To send a string of registers to the dispenser, enter the number of registers to send (starting from the specified Base Reg No).
8	Send Multiple: Send Multiple	Click to send the specified register set string.
9	Receive Multiple: Base Reg No	To read a string of registers from the dispenser, enter a starting register value (Reg No under Output Table).
10	Receive Multiple: No of Registers	To read a string of registers from the dispenser, enter the number of registers to read (starting from the specified Base Reg No).
11	Receive Multiple: Send Multiple	Click to read the specified register set string.

Appendix B, Remote Communication (continued)

Register Set for the NX Protocol

This section includes the complete register set for operating the UltimusPlus dispenser via the NX protocol. To facilitate implementation and use of the register set, Nordson EFD recommends using the Nordson NX Client Application as described in the previous section.

Output Table

The Output Table displays all currently active parameters. Some parameters are scaled by 100, 1000, or 10000 to make them whole numbers, as noted under Comments.

Output Table					
Register #	**Parameter (Reg Name)**	**Data Type**	**Minimum**	**Maximum**	**Comments**
REG 0	Digitals	n/a	—	—	Data flags. See "REG 0 Details for Output Table" on page 68.
REG 1	Model Type	Range	1	2	1 = UltimusPlus I 2 = UltimusPlus II
REG 2	Program NUM	Range	1	16	
REG 3	Dispense Mode	Range	1	4	1 = Single Shot 2 = Steady Mode 3 = Teach Mode 4 = MultiShot
REG 4	Dispense Time	Range	0.0001	9999	10000x (12345 = 1.2345 s)
REG 5	Dispense Pressure	Range	0.3 psi	100 psi	100x (1234 = 12.34 psi / bar / kPa)
			0.02 bar	6.89 bar	
			2.06 kPa	689.47 kPa	
REG 6	Dispense Vacuum	Range	0 inH$_2$O	18 inH$_2$O	100x (123 = 1.23 inH$_2$O/ inHg / kPa)
			0 inHg	1.32 inHg	
REG 7	System Count	Range	0	4294967295	32-bit number
REG 8	Shot Count	Range	0	4294967295	32-bit number
REG 9	MultiShot Count	Range	0	9999	
REG 10	MultiShot Time	Range	0.1	999.9	100x (123 = 1.23 s)
REG 11	System Date	Range	19011213	20380119	YYYYMMDD
REG 12	System Time	Range	0	235959	HHMMSS
REG 13	Software Version	Range	0	99.999	Scaled to 1000
REG 14	Pressure Units	Range	0	2	0 = psi 1 = bar 2 = kPa
REG 15	Vacuum Units	Range	0	2	0 = inH$_2$O 1 = inHg 2 = kpa
REG 16	Time Format	Range	0	2	0 = AM 1 = PM 2 = 24HR
REG 17–19	Reserved	—	—	—	

Appendix B, Remote Communication (continued)

Register Set for the NX Protocol (continued)

Output Table (continued)

REG 0 Details for Output Table		
Reg 0 Bit Number	Function	Execution
0	Unit Running	1 = Unit is dispensing 0 = Unit is not dispensing
1	Emergency Stop	1 = Unit is in emergency stop mode 0 = Unit is in normal operating mode
2	Sleep mode	1 = Unit is in sleep mode 0 = Unit is not in sleep mode
3	Log full	1 = Log is full 0 = Log is not full

Appendix B, Remote Communication (continued)

Register Set for the NX Protocol (continued)

Input Table

The Input Table is used to edit program parameters and some system settings. Some parameters are scaled by 100, 1000, or 10000 to make them whole numbers, as noted under Comments.

Input Table					
Register #	**Parameter (Reg Name)**	**Data Type**	**Minimum**	**Maximum**	**Comments**
REG 0	Digitals	n/a	—	—	Data flags. See "REG 0 Details for Input Table" on page 70.
REG 1	Program NUM	Range	1	16	
REG 2	Dispense Mode	Array	1, 2, 4		1 = Timed 2 = Steady 4 = MultiShot
REG 3	Dispense Time	Range	0.0001 s	9999 s	Scaled by 10000
REG 4	Pressure Units	Range	0	2	0 = psi 1 = bar 2 = kpa
UltimusPlus I REG 5	Pressure	Range	10	100	Pressure units in psi (scaled by 100)
			0.68	6.89	Pressure units in bar (scaled by 100)
			68.9	689.4	Pressure units in kpa (scaled by 100)
UltimusPlus II REG 5	Pressure	Range	0.3	15	Pressure units in psi (scaled by 100)
			0.02	1.03	Pressure units in bar (scaled by 100)
			2.1	103.4	Pressure units in kpa (scaled by 100)
REG 6	Vacuum Units	Range	0	2	0 = inH$_2$O 1 = inHg 2 = kpa
REG 7	Vacuum	Range	0	18	Vacuum units in inH$_2$O (scaled by 100)
			0	1.32	Vacuum units in inHg (scaled by 100)
			0	4.4	Vacuum units in kpa (scaled by 100)
REG 8	MultiShot Count	Range	0	9999	
REG 9	MultiShot Time	Range	0.1	999.9	Scaled by 100
REG 10	System Date	Range	19011213	20380119	YYYYMMDD
REG 11	System Time	Range	0	235959	HHMMSS
REG 12–19	Reserved	—	—	—	

Appendix B, Remote Communication (continued)

Register Set for the NX Protocol (continued)

Input Table (continued)

Bit	Hex	Decimal	Function	Execution
REG 0 Details for Input Table
0	0x0001	1	Trigger	1 = Unit will start dispensing (toggle from 0 to 1) 0 = Unit will stop dispensing in Steady Mode Dispensing occurs based on the dispense mode.
1	0x0002	2	Emergency Stop	1 = Unit will enter Emergency Stop mode 0 = Unit will exit Emergency Stop mode
2	0x0004	4	Sleep Mode	1 = Unit will enter Sleep Mode 0 = Unit will exit Sleep Mode
3	0x0008	8	Delete Log Bit 0	This command is combination of BIT_3 and BIT_11. If both bits are set, then delete the log file. 1 = Delete the log file (toggle from 0 to 1) 0 = Do not delete the log file
4	0x0010	16	Date and Time	1 = Unit will set the new date and time entered in REG 10 and REG 11 (toggle from 0 to 1) 0 = Unit will not accept new date and time
5	0x0020	32	Update Program Parameters	1 = Unit will accept new program parameters from REG 1 to REG 9 (toggle from 0 to 1) 0 = Unit will not accept new program parameters
6	0x0040	64	Update Program Number	This command is combination of BIT_5 and BIT_6. If any one of these bits is set (toggled from 0 to 1), then the new program number is updated.
7	0x0080	128	Update Pressure and Vacuum Units	This command is a combination of BIT_5 and BIT_7. If any one of these bits is set (toggled from 0 to 1), then the new pressure and vacuum units are updated.
8	0x0100	256	Reserved	
9	0x0200	512	Reserved	
10	0x0400	1024	Reserved	
11	0x0800	2048	Delete Log Bit 1	This command is a combination of BIT_3 and BIT_11. If both bits are set, then delete the log file. 1 = Delete the log file (toggle from 0 to 1) 0 = Do not delete the log file

NOTES:

- Trigger bit (BIT_0), Delete Log Bits (BIT_3 and BIT_11), Date and Time (BIT_4), Update Program Parameters (BIT_5), Update Program Number (BIT_6), and Update Pressure and Vacuum Units (BIT_7) must be toggled for proper operation.

  For example, to trigger remotely, the trigger bit must change from the 0 state to the 1 state (toggle). The trigger will occur on the rising edge (low to high transition of the bit state). Operation is similar for all other above bits.

- Emergency Stop (BIT_1) and Sleep Mode (BIT_2) function based on the current status of the bits.

  For example, if BIT_1 = 1, the emergency stop signal is set; if BIT_1 = 0, the emergency stop signal is reset. Similarly, for Sleep Mode, if BIT_2 = 1 (the unit is in Sleep Mode; if BIT_2 = 0, the unit is not in Sleep Mode.

Appendix B, Remote Communication (continued)

Message Format for the NX Protocol

This section provides the read, write, and error messages that are implemented in the server (the UltimusPlus dispenser. The server and the Client (the PLC / PC) communicate over standard TCP/IP. The Nordson NX Client Application uses the message format shown in this section. Any PLC or program can use this format to communicate with the dispenser.

Read messages (requesting output registers) are differentiated from write messages (sending input registers) by their message format. The message format is loosely based on the Modbus/TCP framework, but does not strictly adhere to it. The basic commands (function codes) are supported by Modbus protocol. The Modbus frame considers the data in byte format, but for readability messages are formatted as text.

When the Client sends a request, the server (the dispenser) parses the received request and validates it. If invalid data is received, the server responds with an error code. The Modbus/TCP framework is used to formulate the data. When a message is invalid, the server responds to the Client with the command OR'ed with 0x80 and an error code. The Client application must check this bit when it receives a response from the server to determine whether the data send was successfully processed or not.

NOTE: The actual data from the Client must be in CSV (Comma Separated Values) format.

Read Request (Sent from Client to Dispenser)

Description	Data
Command	3
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]

Read Request Response (Sent from Dispenser to Client)

Description	Data
Command	3
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]
Register Data 1	XXXXX
Register Data 2	XXXXX
….	….

Read Request Example: Client request to read 5 registers, starting at Register 0

Data sent from client	3, 0, 5;
Response from dispenser	3, 0, 5, 0, 1, 1, 150, 5600;

Read Request Example: Client request to read all 20 registers, starting at Register 0

Data sent from client	3, 0, 20;
Response from dispenser	3, 0, 20, 0, 1, 1, 1, 150, 5600, 100, 11898, 4, 5, 10, 20210806, 114501, 2165, 0, 0, 2, 0, 0, 0;

Read Request Example: Client request to read 3 registers, starting at Register 4

Data sent from client	3, 4, 3;
Response from dispenser	3, 4, 3, 150, 5600, 100;

Appendix B, Remote Communication (continued)

Message Format for the NX Protocol (continued)

Read Request Error Response (Sent from Dispenser to Client)

Description	Data
Command	131 (0x83)
Error Code	-1 Data Format Error -2 Data Limit Error

Read Error Example: Client request to read 5 registers, starting from Register 0, but invalid frame is sent

Data sent from client	3, 0;
Response from dispenser	131, -1;

Explanation: 131 (0x83) = Result is command OR'ed with 0x80 (0x03 | 0x80 = 0x83)
        -1 = Data Format Error

Read Error Example: Client request to read 5 registers, starting from Register 0, but invalid number of registers sent (valid number of registers is 1 to 20)

Data sent from Client	3, 0, 21;
Response from dispenser	131, -2;

Explanation: 131 (0x83) = Result is command OR'ed with 0x80 (0x03 | 0x80 = 0x83)
        -2 = Data Limit Error

Appendix B, Remote Communication (continued)

Message Format for the NX Protocol (continued)

Write Request (Sent from Client to Dispenser)

Description	Data
Command	16
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]
Register Data 1	XXXXX
Register Data 2	XXXXX
….	….

Write Request Acknowledgment (Sent from Dispenser to Client)

Description	Data
Command	16
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]
Register Data 1	XXXXX
Register Data 2	XXXXX
….	….

Write Request Example: Client request to write all 20 registers, starting at Register 0

Data sent from Client	16, 0, 20, 16, 1, 1, 150, 0, 5600, 0, 100, 5, 10, 20210608, 2, 114501, 0, 0, 0, 0, 0, 0, 0;
Response from dispenser	16, 0, 20, 16, 1, 1, 150, 0, 5600, 0, 100, 5, 10, 20210608, 2, 114501, 0, 0, 0, 0, 0, 0, 0;

Write Request Example: Client request to write 5 registers, starting at Register 1

Data sent from Client	16, 1, 5, 1, 1, 150, 0, 5600;
Response from dispenser	16, 1, 5, 1, 1, 150, 0, 5600;

Appendix B, Remote Communication (continued)

Message Format for the NX Protocol (continued)

Write Request Error Response (Sent from Dispenser to Client)

Description	Data
Command	144 (0x90)
Error Code	-1 (Data Format Error) -2 (Data Limit Error)

Write Error Example: Client request to write 5 registers, starting at Register 0, but all 5 data values not sent

Data sent from Client	16, 0, 5, 0, 1, 1;
Response from dispenser	144, -1;

Explanation: 144 (0x90) = Result is command OR'ed with 0x80 (0x10 | 0x80 = 0x90)
           -1 = Data Format Error

Write Error Example: Client request to write 5 registers, starting at Register 1, but one of the data values is out of range and the second data value is 6, but the system accepts only 1, 4 for REG 2

Data sent from Client	16, 1, 5, 1, 6, 150, 0, 5600;
Response from dispenser	144, -2;

Explanation: 144 (0x90) = Result is command OR'ed with 0x80 (0x10 | 0x80 = 0x90)
           -2 = Data Limit Error

Appendix B, Remote Communication (continued)

Message Format for the NX Protocol (continued)

Full Examples of NX Protocol Message Formats

Read Request Example: Read the program number and dispense mode

Data sent from Client	3,1,2;
Response from dispenser	3,1,2,5,4;

NOTES:

- This read request (as with all read requests) starts with 3. The data requests that the reading start at register 1 and includes 2 registers.

- The response repeats the request followed by the data for the registers. In this example, 5 indicates that program 5 is active, and 4 indicates that MultiShot mode is active.

Write Request Example: Activate a new program (example 1)

Data sent from Client	16,1,1,3;
Response from dispenser	16,1,1,3;

Data sent from Client	16,0,1,64;
Response from dispenser	16,0,1,64;

Data sent from Client	16,0,1,0;
Response from dispenser	16,0,1,0;

NOTES:

- The first command sets the Program Name (REG 1) to 3, in preparation for the switch to program 3.

- The second command sets the Program Number bit (64) high in REG 0, thus activating program 3.

- The third command clears REG 0 of the Program Number bit, allowing this sequence to work in the future.

Write Request Example: Activate a new program (example 2)

Data sent from Client	16,0,2,64,3;
Response from dispenser	16,0,2,64,3;

Data sent from Client	16,0,1,0;
Response from dispenser	16,0,1,0;

NOTE: This request sets the Program Number bit (64) of REG 0 high and also sets the Program Name (REG 1) to 3 in one command.

Appendix B, Remote Communication (continued)

Message Format for the NX Protocol (continued)

Full Examples of NX Protocol Message Formats (continued)

Write Request Example: Change program values

Data sent from Client	16,0,8,32,15,1,1500,0,1475,0,600;
Response from dispenser	16,0,8,32,15,1,1500,0,1475,0,600;

Data sent from Client	16,0,1,0;
Response from dispenser	16,0,1,0;

NOTE: This request sets the Program Number to 15, the Dispense Mode to Timed (1), the Dispense Time to 0.1500 seconds, the Pressure Units to psi, the Pressure to 14.75, the Vacuum Units to inH$_2$O, and the Vacuum to 6.00.

NX Protocol Operational Summary

- The Nordson NX Client Application reads the Input Table and updates the Output Table in 10 ms intervals.
- The Program Number (REG 1) and program parameters (REG 2 to REG 11) can be changed remotely by updating the Input Table along with the control bit in REG 0.
- Program parameters can be adjusted locally (at the dispenser) or remotely.
- You can remotely monitor 17 dispenser parameters (registers) by polling or by requesting single or multiple data. All the dispenser parameters are updated in Output Table.
- There are a total of 11 registers in the Input Table and 17 registers in the Output Table.
- All TCP packets are sent and received with a semicolon (;) as the termination character at the end of the packet.
- If the Ethernet connection is lost, first correct the physical Ethernet connection, then reboot or cycle power to the UltimusPlus dispenser.

Appendix B, Remote Communication (continued)

FTP Client Application for Dispense Log Exports

Once the UltimusPlus dispenser and the Client are on the same network, the Dispense Log can be exported using an FTP (File Transfer Protocol) client application. This feature is useful if you want to set up your system to automatically export the log at end of every shift, for example. Follow this procedure to use the Filezilla® FTP client application for Dispense Log exports.

NOTE: Any FTP client application similar to Filezilla can be used.

1. Download the Filezilla® FTP client application from the following link. Be sure to select the correct download file based on your PC configuration (32-bit OS / 64-bit OS): https://filezilla-project.org/download.php?type=client

2. Connect an Ethernet cable between the Client and the UltimusPlus dispenser.

3. Set up the IP address of the Client as explained under "Dispenser and Client Setup" on page 60.

4. Open Filezilla and check the software version number. The version should be 3.51.0 or later.
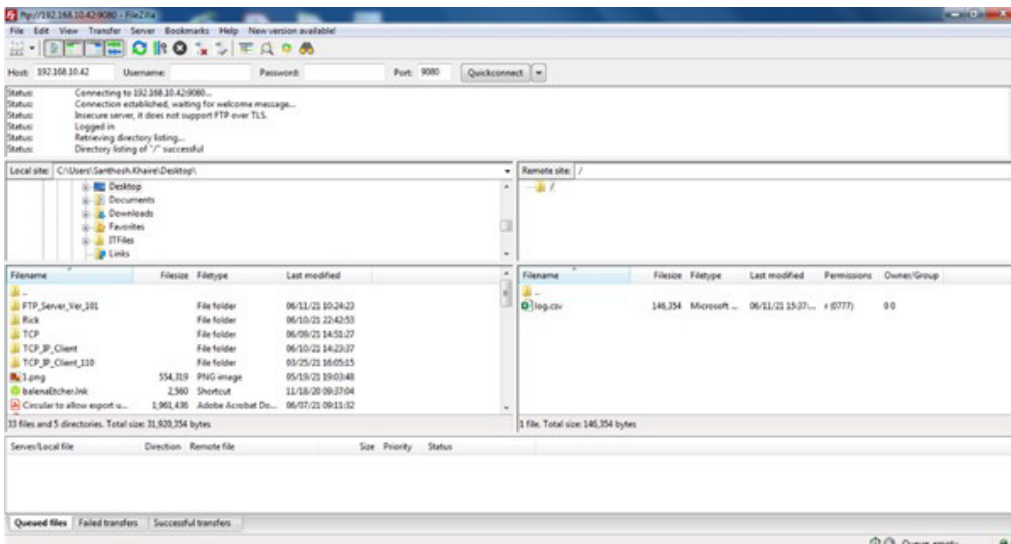

5. Enter the following UltimusPlus IP address and port number, then click QUICKCONNECT:

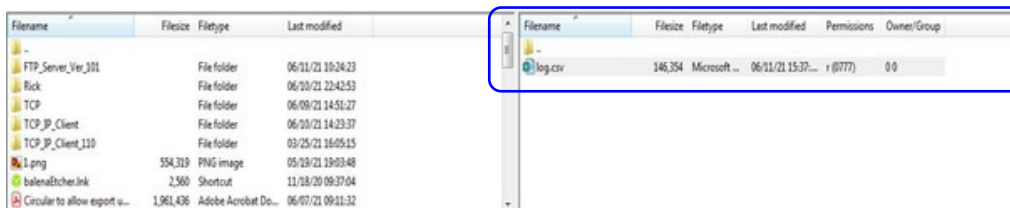   • IP Address: 192.168.10.42 (IP address of UltimusPlus dispenser)

    • Port: 9080
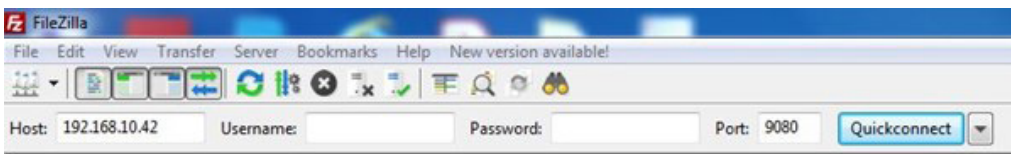
The main screen opens.

Appendix B, Remote Communication (continued)

FTP Client Application for Dispense Log Exports (continued)

6. In the left-side file navigation panel, find the "log.csv" file under "C:\Users\YourPCName\Desktop\" and drag it to the right-side panel where the copy of it should be saved.

7. If the "log.csv" file is successfully copied, you will see the result shown below.

NOTES:

• The FTP client application allows only one anonymous user with read only access to the log file.

• Users cannot write or modify the log.csv file in the UltimusPlus dispenser. The log.csv file can only be copied to a PC.

• Users cannot browse or view the content of other folders in the UltimusPlus dispenser.

NORDSON EFD LIMITED WARRANTY[1][2]

This Nordson EFD product is warranted from the date of purchase to be free from defects in material and workmanship (but not against damage caused by misuse, abrasion, corrosion, negligence, accident, faulty installation, or by dispensing material incompatible with equipment) when the equipment is installed and operated in accordance with factory recommendations and instructions.

Nordson EFD will repair or replace free of charge any defective part upon authorized return of the part prepaid to our factory during the warranty period. The only exceptions are those parts which normally wear and must be replaced routinely, such as, but not limited to, valve diaphragms, seals, valve heads, needles, and nozzles.

In no event shall any liability or obligation of Nordson EFD arising from this warranty exceed the purchase price of the equipment.

Before operation, the user shall determine the suitability of this product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. Nordson EFD makes no warranty of merchantability or fitness for a particular purpose. In no event shall Nordson EFD be liable for incidental or consequential damages.

This warranty is valid only when oil-free, clean, dry, filtered air is used, where applicable.

[1]For end users in Asia, two years
[2]For machine builders in all regions, 18 months

NOTE: If items (1) and / or (2) do not apply, go to warranty on next page.

NORDSON EFD FIVE YEAR NO-FAULT WARRANTY[1][2]

This Nordson EFD product is warranted for five years from the date of purchase to be free from defects in material and workmanship (but not against damage caused by misuse, abrasion, corrosion, negligence, accident, faulty installation, or by dispensing material incompatible with equipment) when the equipment is installed and operated in accordance with factory recommendations and instructions.

Nordson EFD will repair or replace free of charge any defective part, regardless of fault, upon authorized return of the part prepaid to our factory during the warranty period. The only exceptions are those parts which normally wear and must be replaced routinely, such as, but not limited to, valve diaphragms, seals, valve heads, needles, and nozzles.

In no event shall any liability or obligation of Nordson EFD arising from this warranty exceed the purchase price of the equipment.

Before operation, the user shall determine the suitability of this product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. Nordson EFD makes no warranty of merchantability or fitness for a particular purpose. In no event shall Nordson EFD be liable for incidental or consequential damages.

This warranty is valid only when oil-free, clean, dry, filtered air is used, where applicable.

[1]For all regions, excluding Asia
[2]Excluding machine builders

NOTE: For end users in Asia and / or machine builders in all regions, go to warranty on previous page.

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For Nordson EFD sales and service in over 40 countries, contact Nordson EFD or go to www.nordsonefd.com.

Global
800-556-3484; +1-401-431-7000
info@nordsonefd.com

Europe
00800 7001 7001
infoefd.europe@nordsonefd.com

Asia
China: +86 (21) 3866 9006; china@nordsonefd.com
India: +91 80 4021 3600; india@nordsonefd.com
Japan: +81 03 5762 2760; japan@nordsonefd.com
Korea: +82-31-736-8321; korea@nordsonefd.com
SEAsia: +65 6796 9522; sin-mal@nordsonefd.com